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THE STANDARD

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF WEST HAM.

MOTOR AMBULANCES.

The Corporation are prepared to receive tenders for the supply of Two Motor Ambulance Vehicles for general accident and medical transport work.

Each vehicle is required to accommodate two stretcher cases, with attendant. The body and fittings should be in accordance with the latest standard practice, and the vehicles complete with regulation lamps and fittings, and finished in colour to be approved.

Tenders should contain specification and details of chassis, tires, body and fittings, and full particulars of speed, weight, consumption of petrol or electricity, illustrations of similar vehicles made by the firm tendering, and references to users to whom application for particulars may be made, and the date by which delivery can be made.

Further information, if required, can be obtained from the Medical Officer of Health, Dr. Sanders, Town Hall, Stratford.

The Contractor whose tender is accepted, and with whom a contract is entered into, will be required to pay all workmen employed by him in or about the contract such rates of pay, and observe such hours of labour, as are embodied in the schedule, which will be part of the contract. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

Tenders should be endorsed "Tender for Ambulances," and delivered in a sealed envelope to the Town Clerk, Town Hall, West Ham, E. 15, by 4 o'clock on July 17th, 1917.

GEORGE E. HILLEARY,
Town Clerk.

Town Hall, West Ham.
June 27, 1917.

CORPORATION OF DUBLIN.

TRANSFORMERS.

The Electricity Supply Committee of the Corporation of Dublin are prepared to receive tenders for:

(*a*) The Supply, and
(*b*) The Supply and Erection of Transformers

during the period of one year from signing the contract.

Specifications, with general conditions and form of tender, can be obtained from the City Electrical Engineer, Fleet Street, Dublin, on and after Thursday, June 28, 1917, on payment of one guinea for each specification, which sum will be returned on receipt of a *bona fide* tender.

Tenders, addressed "Chairman of the Electricity Supply Committee, Lord Edward Street, Dublin," and marked "Tender for Transformers," to be received not later than noon on Monday, July 16, 1917.

Tenders will be subject to ratification by the Municipal Council, which does not bind itself to accept the lowest or any tender.

A tender for either (*a*) or (*b*) may be accepted separately if found desirable.

FRED. J. ALLAN,
Secretary.

Electricity Supply Committee's Offices,
Lord Edward Street, Dublin.
June 27, 1917.

ERITH URBAN DISTRICT COUNCIL.

The Erith Urban District Council are prepared to consider offers for the purchase of:—

One "Bettington" type Water-tube Boiler, evaporative capacity 10,000 lbs., at 160 lbs. working pressure, with all accessories in excellent working condition.

Purchaser to bear cost of dismantling and removal.

Offers to reach the undersigned, from whom all particulars may be obtained, not later than July 28th.

Walnut Tree Road, Erith.

JOHN CHARLES WILLIAMS, A.M.I.E.E.,
Engineer and Manager.

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Wanted immediately, two Stokers for Babcock boilers, fitted with chain grate stokers. Wages 10½*d.* per hour, including war bonus. Applicants must be ineligible for military service, and must be able to obtain a leaving certificate. Apply, stating age, experience, &c., to the undersigned.

Electricity Works, Redditch,
Worcester.
June 13, 1917.

R. N. MAYNE,
Engineer and Manager.

THE MANCHESTER MUNICIPAL

SCHOOL OF TECHNOLOGY

(UNIVERSITY OF MANCHESTER).

PRINCIPAL: J. C. M. GARNETT, M.A. (late Fellow of Trinity College, Cambridge).

The Session 1917-18 will open on 5th October. Matriculation and Entrance Examinations will be held in July and September.

The Prospectus, forwarded free on application, gives particulars of the courses leading to the Manchester University degrees in the Faculty of Technology, and of the provision for Advanced Study and Research in the following departments:—

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SANITARY ENGINEERING (including Municipal Engineering),
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THE TEXTILE INDUSTRIES,
PRINTING AND PHOTOGRAPHIC TECHNOLOGY,
MINING,
ARCHITECTURE.

Intending students may enrol for the Session 1917-18 from 1st August, 1917. Members of the University under 18 years of age are eligible for membership of the Officers' Training Corps.

Electric Tramcar Handbook

FOR
MOTORMEN, INSPECTORS,
AND DEPÔT WORKERS.

By W. A. AGNEW.

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Tramway and Railway World

Established in 1892 and Published by

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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JULY 7, 1917.

GROWING INDISCIPLINE.

To tramway managers, and no doubt to the managers of many other classes of undertakings, this war has brought many troubles. Not the least of them is the difficulty, if not the impossibility, of enforcing discipline among the staffs. In the earlier period of the war the evil had not arisen; it was as staffs became depleted through the demand for men for military service that the trouble gradually grew up. Every man that remains is fully conscious of his additional importance as a unit in the organisation. On that account he is sometimes apt to break rules, to make unreasonable demands, and to be disagreeable. If any fault is found with him, it is very easy for him to throw up his job and to get employment elsewhere. All sorts of businesses are in need of men and the National Service scheme also calls for workers. In such circumstances the manager has a difficult task to carry on the undertaking properly. He is at the mercy of a body of men, some of whom are bound to be unreasonable. Despite war bonus additions to wages, there are constant strikes and threats to strike in different parts of the country. The present position of the tramway employees in Manchester is the most extraordinary of all. They demanded a war bonus of 10s. a week, and on the matter going to arbitration they were awarded only 2s. 6d. This did not satisfy them, and they adopted a sort of a strike, which was joined in at first by the tramway employees in a number of Lancashire towns. This "stay-in strike," as it is called, consists in remaining at work but refusing to allow excess passengers in the cars beyond the number permitted under former regulations, and in refusing overtime service required for taking out the extra cars for the heavy traffic in the mornings and evenings. This sort of thing has been going on for over a fortnight, and at the time of writing no settlement is in sight. There has been plenty of negotiations and meetings, but no strong action has been taken by the management. It is not conceivable that in peace times and with ordinary discipline in force any dead-lock of that sort would be allowed to continue. But as it is impossible to get substitutes, managers in this and other cases have to struggle along as best they can with the men they have. As to the war bonus addition to wages, ample machinery is in existence for settling disputes, and it is fair to say that in many cases the awards have been accepted by the employees. But the longer the war lasts, the greater are likely to be the demands for higher wages, and the worse discipline is likely to become as staffs are more and more depleted. Not long ago a telegram from Petrograd appeared in one of the daily newspapers stating that unskilled men were being paid wages equal to £500 a year, while skilled men were getting at the rate of £1,000 a year. Consequently factories were closing down. We are some distance from that pass yet in connection with tramways in this country, but things are sufficiently disquieting. Loyal acceptance of wage arbitration awards is one desideratum, and the other is the cultivation of an honourable feeling among employees against taking any unfair advantage of the present situation. The want of compulsory discipline should be made good by a voluntary discipline. If men are put on their honour, good results are often obtained, and possibly a new use might be found for the trade unions in this connection. By conference with the executives of these bodies a strong influence might be brought to bear on those tramway employees who are lacking in a sense of duty in these serious times.

REVISED FARES AND STAGES.

At a recent meeting of the Coventry Council, it was stated that the increase in wages would involve some readjustment of the tramway fares.

Certain alterations have been made in fares on the Burton and Ashby tramways, which provide for an increase of ½*d.* or 1*d.* on different stages. The new fares, which came into force on July 1, in no case exceed the basis of a penny per mile or a fraction thereof.

Hull Tramways Committee have decided that the privilege hitherto granted to nurses of riding on the cars free of charge should be withdrawn. Councillor Hakes, chairman of the Tramways Committee, said that between 600 and 700 nurses were affected. It was a question whether the tramways should become a benevolent institution or a business concern that was going to pay.

L.C.C. TRAMWAY MATTERS.

APPOINTMENTS IN THE ELECTRICAL BRANCH.

At the fortnightly meeting of the London County Council on Tuesday it was decided that the designation of certain positions in the electrical branch should be altered in accordance with the report on the reorganisation of the tramways department, presented to the Council on February 20, 1917. The positions and salaries to be attached to them are as follows:—

Superintendent of Greenwich generating station, to be styled power station engineer; salary £500, increasing by four annual increments of £25 and two of £50 to £700 a year.

Resident electrical superintendent (southern section) to be styled distribution engineer (southern section); salary £400, increasing by annual increments of £25 to £600 a year.

Resident electrical superintendent (northern section) to be styled distribution engineer (northern section); salary £400, increasing by annual increments of £25 to £600 a year.

It was agreed on the recommendation of the Highways Committee that Mr. E. W. Dickinson, superintendent of Greenwich generating station, should be the power station engineer at a commencing salary of £500 (Mr. Dickinson's present salary is £450 a year); that Mr. E. L. Pope, resident engineer, should be distribution engineer (southern section) (Mr. Pope's present salary is £450 a year); and that Mr. T. L. Horn (present salary £400 a year) should be distribution engineer (northern section); both the latter to be appointed at a commencing salary of £500 a year.

COAL AND TROLLEY WIRE.

The Highways Committee reported that to provide for the necessary supply and storage of coal required for the Greenwich generating station a sum of £12,800 will be required above the amount provided in the revenue estimates for 1917–18.

The Committee recommended that tenders be invited from selected firms for the supply of trolley wire.

The Sheerness and District Electric Power and Traction Company propose to discontinue its services at an early date, and to remove the rails and overhead equipment, unless the two local councils in the area affected shall decide to purchase the undertaking by anticipating the power which would become theirs a few years hence. The company have suffered severely owing to many of their employees having left for military service. It has also been affected by the introduction of motor omnibuses on the tramway routes during the past three years.

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THE TRAMWAY ASSOCIATION DINNER.

The dinner of the Tramways and Light Railways Association took place on the evening of Friday, June 29, at the Trocadero Restaurant, London, and was (as in other years during the war) quite informal in character, without music, toasts, or speeches.

The Rt. Hon. Viscount Chilston (the President) occupied the chair, and the following were present:—

Albanese, G. S.
Armitage, R., M.P.
Baldwin, O. H.
Balfour, Geo.
Barnard, J.
Barralet, E.
Beckett, J.
Beken, H. R.
Benedict, E.
Beaumont, W. W.
Bickersteth, C.
Blain, H. E.
Bland, F.
Bourne, F.
Brooks, K. W.
Browning, J.
Bruce, J. K.
Buckley, C. L.
Bulfin, I.
Burnet, C. D.
Burpee, Major
Burton, W. C.
Burfoot, F.
Bruce, Lt. C. D.
Callow, S. H.
Cameron, Lieut. B. T.
Cameron, John
Cameron, J. F.
Cater, J. M.
Chambers, A. W.
Cheyney, W. B.
Chilston, Rt. Hon. Viscount
Chivers, A. W. A.
Clarke, Sir Fred.
Coates, F.
Cole, T. W.
Compton,—
Conibear, H. P.
Cooper, A. T.
Corbett, Lt. R. W. T.
Coutts, Major F.
Coveney, A.
Crookes, Harris F.
Davidson, C.
de Turckheim, A.
Easton, T. P.
Edwardes, E. H.
England, H.
Fearnley, A. R.
Fell, A. L. C.
Fergusson, F. A. K.
Fleming, E. H.
Freir, W. E.
Fry, Geo.
Fry, J.
Garcke, S.
Gerrish, Geo.
Glenn, J. B.
Goodyer, T. B.
Hamilton, J. B.
Hardy, W. E.
Harvey, L. E.
Howley, R. J.
Hawley, W. H.
Hays, D.
Hewer, F.
Holford, G. W.
Hollington, A. J.
Hunt, L. A.
Hunter, Jos.
Hopking, W. S.
Irvine, F.
Ivey, Ald. W.
Jackson, A. H.
Jacob, H. M.
Johnson, A.
Kelly, J. J.
Kingsford, B.
Knight, C. J.
Lean, E. H.
Ledger, S. A.
Littler, H. W.
Lorkin, W. L.
Lotery, H.
McCabe, U.
McCallum, A.
Madgen, W. L.
Mallins, C. W.
Martin, H.
Mason, A. V.
Maynard, H. F.
Mayne, Coun. R.
Mitchell, J. C.
Morrison, A. C.
Moss, J. F.
Mozley, H.
Munro, E. M.
Murray, Lee.
Myers, D. R.
New, A.
Norton, A.
Pickering, W. B.
Quilliam, E. S.
Renwick, H. B.
Robertson, A.
Robson, W. T.
Rooke, C. W.
Saunders, F. E.
Sayers, H. M.
Scholey, H.
Sellon, S.
Shears, S. F.
Shearer, W.
Simcock, R. T.
Slattery, L.
Spark, H. K.
Spencer, C. J.
Spicknall, M. O.
Stanley, Hon. A., M.P.
Stanley, C. D.
Stanley, G. V.
Stevens, H. M.
Tegetmeier, C. G.
Thom, W.
Thornbury, L. O.
Toms, A.
Townell, H. E.
Twake, W. H.
Troughton,—
Ullmann, W. C.
Walkley, W. W.
Walton, A. H.
White, H. L.
White, H. R.
Whyte, A. G.
Wilkinson, R. H.
Willcox, A. M.
Williams, H. L.
Wray, A. E.
Wyld, W.

After dinner, on the proposal of the President, the toast of the King was duly honoured.

The Hon. Arthur Stanley, intervening in the *post prandial* conversation, remarked that although speeches and toasts were not on the programme, he thought all present would like to drink to the health of their President,

The President thanked them for the cordial reception he had received, and explained that he had intruded at their congress ("No"!) that afternoon because he thought he would like to see the business side of the Association, of which he had hitherto seen only the convivial side. He certainly appreciated the papers that were read, and more than once he felt inclined to join in the discussions but on the whole perhaps he acted more wisely by "sticking to his own last"—so he had remained silent in the chair. More than one of the topics had, however, attracted his attention, such as the conditions prevailing after the war, and women tramcar drivers. He thought that after his visit to that afternoon's congress it was very probable that he would attend the next one, and if he did so he might be tempted to join in the discussion. He had certainly received the impression that there was a very business-like side to the Association. He fully sympathised with the managers present in the difficulties they must all have experienced in carrying on their business—difficulties which had been so largely increased by their staffs being called up for service in the war. However, he hoped that when the time came round for their next meeting they would find themselves in happier circumstances. But he could not shut out the thought that there would be serious difficulties to contend with even when the war was over, and it would be for their Council to try to devise wise methods for meeting those difficulties.

Appeal to Local Authorities for Economy in Timber.—Tramway managers and permanent way and borough engineers are affected by a circular which has been issued by the Local Government Board urging the need for reducing the consumption of timber. The Board urge that the use of timber for road works should be confined to repairs, that the relaying of wood paving should be deferred, and that where works for the improvement of road surfaces cannot be postponed, the authorities should adopt some alternative method such as surfacing with asphalte or other bituminous material, or taking up a section of sound wood paving, which could be replaced with setts, and using the blocks for repairing worn out places.

Compensation for Injuries.—A settlement has been reached in the Court of Session, Edinburgh, in an action by Donald Campbell, watchmaker, Dumbarton, and Mrs. Campbell, his wife, against the Dumbarton Tramways Company, for damages for injuries caused by a tramcar colliding with the rear of a cab in which the pursuers were. The pursuers accepted offers amounting to £200 and expenses. —In Lambeth County Court, Miss Annie Jones was awarded £250 against London County Council as damages for personal injuries. The plaintiff, who was a passenger, pulled the bell for the car to stop, and she averred that when she was alighting the car started and she was thrown down and sustained a thigh fracture. For the defence it was stated that the bell to restart the car was rung by an inside passenger, the conductor being on the top collecting fares.

MISCELLANEOUS NEWS AND NOTES.

New Cars at Huddersfield.—Huddersfield Corporation Tramways have received six new cars constructed for them by Messrs. Dick, Kerr and Company, Ltd.

Wages Advance at Leicester.—At a meeting of the Tramways Committee recently it was decided to grant an advance in wages asked for by motormen and conductors. The advance amounts to ½*d.* per hour, *i.e.* from 6½*d.* to 7*d.*

Rail Renewals at Halifax.—The borough engineer of Halifax has in preparation a report covering the cost of taking up rails on certain disused routes and relaying them where renewals are required.

Discharged Soldiers as Motormen.—Mr. W. Jensen, manager of Chatham Tramways Company, states that wounded soldiers who have been tried as motormen were found to be lacking in nerve and would not remain at the work.

Electrical Machinery in Germany.—The German Government, according to an announcement in the *Frankfurter Zeitung*, recently requisitioned all electrical machinery and appliances, none of which can now be either bought or sold without special authority.

Stoke-on-Trent Tramways.—Stoke-on-Trent County Borough Council have decided, subject to the consideration of the clauses, to accept the principle of the agreement submitted by the Tramways Committee for the re-leasing of the undertaking to the Potteries Electric Traction Company, Ltd.

Exeter Tramways Committee are experiencing much difficulty in maintaining the regular service on account of the number of cars in the sheds for which new spare parts are not available. In view of the traffic difficulty and over-crowding they propose to suspend the penny return ticket which has hitherto been granted at mid-day.

Walking Sticks for Wounded Soldiers.—Recently the general manager of the Glasgow Corporation tramways made an appeal to tramway passengers to provide walking sticks for wounded soldiers. A splendid response was made, and altogether sixty-four dozen sticks have now been distributed.

Electricity Bulk Supply.—Mr. G. Roberts, Parliamentary Secretary to the Board of Trade, replying to a question by Mr. P. A. Harris in the House of Commons on June 21, stated that it was not the case that the Departmental Committee on Electricity had prepared a report in favour of dividing the country into definite areas for the production of electricity.

Lease of Barking Tramways.—Representatives of the Ilford and Barking Councils have reached a provisional agreement for the renewing of the lease of the Barking tramway tracks. The period will be three years from June 1, 1917, and the annual rental will be £1,250. The price to be paid for energy supplied from the Barking Council will be 1 1/16*d.*

German Tramways and Air Raids.—Instructions issued at Frankfort-on-the-Main for warnings of air raids order that the tramway service is to stop when the warning artillery salvoes are fired. Notice that the raid is at an end and all danger past will be conveyed by the restarting of the tramways and the loud ringing of bells.

London Omnibus Routes.—A pocket list of routes for the summer season of this year, together with a useful map of London and its environs, indicating the main lines that the motor 'buses follow, has been issued by the London General Omnibus Company. In view of railway restrictions the omnibuses are likely to be more used for short holiday excursions than ever before, so long as petrol or some substitute is available.

Motormen's Anxieties.—Considering the anxiety constantly given to motormen by children running into danger, the extension of safety-first teaching to parents is advisable. A case in point occurred at Bolton, where a mother lifted a restless child of three years from a perambulator while she chatted with a neighbour. The little one immediately ran against a tramcar and sustained fatal injuries.

An Electric Car in Niagara.—Telegrams from America report that an electric car on the Gorge route below Niagara Falls ran off the track owing to a wash-out and fell into the river. According to one account 80 persons were drowned, while another says that 27 were killed and 30 injured. The Gorge route electric railway, it may be recalled, runs for several miles alongside the Niagara River below the Falls, and passengers have a splendid view of the rapids.

Women Conductors at Brighton.—The strike of women conductors was speedily adjusted. The Mayor had a conference with the women, and on Thursday, June 28, there was a prolonged special meeting of the Tramways Committee, at which the subject was considered. At the Town Council in the afternoon the Mayor announced that the strike was settled. The Committee had agreed to take back all the women, and they had also agreed to consider the points in dispute.

Car Lighting.—Since the summer began the tramways authorities of the metropolis have been allowed to resume normal lighting of the covered top decks. The concession, which was greatly appreciated by the public, was granted on condition that the lighting circuits are so arranged that with the exception of the traffic lights the whole of the lighting can be switched off when an air raid warning is given. If one or more interior lights are kept on to complete the circuit they must be kept shrouded so that no light is visible from outside during the period of a warning.

Winter Clothing for Women Conductors.—The question of winter clothing for Hull tramcar conductresses has been before the Tramways Committee. The manager stated that he had communicated with the women asking for their suggestions, and one depot had reported that they would like coats reaching to the knees, and that

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in place of skirts they should have breeches fastened below the knees, with either leather leggings or puttees. "A very sensible suggestion," agreed a number of members. The opinion of the women at the other depots will be invited on this suggestion.

The Electric Power Committee.—Sir Archibald Williamson, Bart., M.P., has consented to act as Chairman of the Committee on Electric Power in place of the Right Hon. F. Huth Jackson, who has resigned on medical grounds. The following representatives of local authorities owning electric supply undertakings have been added to the Committee:—Mr. W. B. Smith, Mr. Harold Dickinson and Mr. E. F. Vesey Knox, K.C. These additions meet the views of the municipalities who contended that they were insufficiently represented.

Edinburgh Tramways Employees, after discussing the various offers made by the company, have resolved to press for arbitration upon their demands. The Chief Industrial Commissioner, Sir George Askwith, will be asked to appoint an arbitrator, and it is understood that the tramways company are agreeable to this procedure. Apparently the main trouble between the company and the employees is the differentiation in the bonus to be paid to the men and the women conductors. The employees hope that the arbitrator will place both on the same footing.

40,000 Employees Subscribe.—As an indication of the general interest of electrical workers in America in providing the sinews of war, the following information taken from the *New York Times* is illuminating:—Over 40,000 employees of the General Electric Company of New York have subscribed for $3,000,000 worth of Lbierty Loan bonds, an average of $75 per individual. The subscriptions were received from the Schenectady, Lynn, Harrison, Fort Wayne, Erie, Pitsfield and other works of the company, as well as from their district offices, and are symptomatic of the attitude of the whole of America.

Rainfall Disorganises Traffic.—The severe rainfall in the night of June 28 caused great inconvenience to the metropolitan railways and tramways. The sharp dip on the Metropolitan Railway just outside Farringdon Street was filled with water and all traffic was suspended. Passengers from North London suburbs had to change at Finsbury Park on to the Great Northern and City and the Piccadilly tubes. The North London Railway trains which usually run on the Great Northern lines at Finsbury Park were cancelled, and Shepherd's Bush station on the Central London Railway was flooded. The London County Council's tramway service, owing to the flooding of the conduits, was disorganised for some time on various lines.

Need of Through Running at Portsmouth.—In recalling the failure to secure mutual running powers on the Portsmouth Corporation Tramways and the lines of the Horndean Light Railway, the *Portsmouth Evening News* says that the borough cars can transport, say, 3,000 people to a junction every hour, while the light railway can deal with only about one-tenth of that number. The result is to be seen in the crowds waiting for a car to carry them over the hill and the wearied and dispirited groups waiting at night at the country stations for a car to carry them home again. Passengers failing to obtain admission to the crowded down cars board the up cars to Horndean, and retain their seats to the annoyance and disappointment of the crowd waiting at the terminus. By linking up the lines a distance of ten miles could be traversed without change of car.

Track Repairing Difficulties.—Complaints having been made as to the condition of the tramway margins in the south-eastern district of the metropolis, Mr. G. H. Hume, chairman of the County Council Highway Committee, has stated that it is due to heavy motor vehicles under war conditions. In consequence of those conditions the permanent way staff were not able to cope with the work promptly, but great efforts are being made to improve matters. Ealing borough surveyor has informed the Council that the engineer to the Tramways Company was doing all he could to repair the track, but the work was delayed owing to the weakened gangs having to be divided to attend to other districts.

Should a Conductor Act as a Constable?—In view of the delay that may be caused, and obstruction to other traffic, it is a moot point whether a conductor should leave his car in order to bring about an arrest. A summons was heard at Woolwich against a man for assaulting a London County Council car conductor. Complainant stated that defendant left the car and entered an omnibus. A passenger then said something, as a result of which witness signalled to the conductor of the 'bus, which stopped. Defendant left that vehicle and hurried up the road. Witness caught him, and told him a lady complained that he had taken her purse, whereupon defendant struck him. Accused, on oath, denied having been on either the car or the omnibus, and said he did not assault the conductor. The magistrate said there was no evidence against the accused with regard to the purse, and no charge was made in respect of it. The conductor acted in good faith, but prisoner would be discharged.

Glasgow Tramway Drawing.—The Town Clerk of Glasgow on June 28 received a communication from the Secretary of the Board of Trade with reference to the written application by the Corporation for authority to carry on the prize drawing scheme for raising funds for the benefit of soldiers and other sufferers by the war. The Board of Trade in their reply state that having regard to the terms and provisions of the Art Union Act they cannot entertain the application of the Corporation. The scheme which the Corporation put before the Board of Trade when the original prize drawing arrangement was declared illegal was for the formation of an Art Union with offices in the City Chambers. The object set out was the promotion of the fine arts by the distribution of prizes consisting of works of art. The subscriptions to the Art Union were to be obtained by the sale of penny tickets, each subscriber to have for each ticket one chance in the weekly drawing. Works of art of the value of not less than £300 per week were to be allotted as prizes. The surplus of subscriptions was to be applied to such charitable purposes connected with the war as the managing committee might select.

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PERSONAL.

Lieut. J. B. Snell, R.E., son of Sir John Snell, has been mentioned in despatches for exceptionally good work in the recent Soudan campaign.

Mr. G. Roberts, deputy engineer of Doncaster electricity and tramways undertaking, will take charge pending the Council's decision as to the rearrangement of work on Mr. Rayner's departure to accept an Admiralty position.

Mr. J. G. Thomson has been appointed boiler house engineer at the Stuart Street station of the Manchester electricity department, in the place of Mr. J. R. Davison, who was recently appointed mechanical engineer of Belfast central electricity station.

Mr. Franklyn L. Turner has been appointed assistant secretary of the Local Government Board in the place of Mr. T. Pitts, C.B., who is retiring on account of ill-health. Mr. Turner has been in the service of the Board for thirty years, and has acted as private secretary for four Presidents.

Mr. H. Dickenson, city electrical engineer, Liverpool, has been nominated by the Association of Municipal Corporations as a member of the Board of Trade Departmental Committee on Electric Power Supply. The nomination was made at the invitation of Sir Albert Stanley in order to meet the request for a larger representation of local authorities upon the committee.

Mr. E. S. Rayner.—The fatuity which sometimes dominates town councils with reference to their most capable officers is well illustrated in the case of Doncaster Corporation. On June 16 last we reported that Mr. E. S. Rayner, electrical engineer and tramway manager to the Council, had been granted an increase of salary. As a matter of fact he had been recommended by the Tramways Committee for the increase, and in the ordinary way it was to be expected that the proposal of the Committee who best knew his work and capabilities would be ratified by the Council. But when the recommendation came before the latter body it led to much debate, and in the end the increase of salary was refused. Mr. Rayner has been able without delay to make the most appropriate reply. As mentioned in this column last week, he has obtained an appointment under the Admiralty. To complete the picture, it remains to be said that the salary paid the Doncaster manager and engineer by the Corporation was £450 a year, and that the Admiralty are going to pay Mr. Rayner £700 a year. Mr. Rayner is to be congratulated, while the Town Council of Doncaster may be cheerfully left to struggle to find a new engineer and manager. In these days it is not easy to find good men, and if the Corporation get into difficulties they will have few sympathisers.

CONTRACTS AND ORDERS.

The Macintosh Cable Company's tender for cable has been accepted by Salford Electricity Committee.

Brighton Lighting Committee have placed an order with the Underfeed Stoker Company for three travelling grate mechanical stokers at £3,087.

Manchester Tramways Committee have accepted the following tenders:—National Rail and Tramway Appliances Company, Ltd., Liverpool, cast iron brake blocks; A. Pearce and Son, Sheffield, steel points and crossings, malleable cast iron, light iron and wire; Shelton Iron, Steel and Coal Company, Stoke-on-Trent, steel tongue points, steel castings and gear case castings; Thos. W. Ward, Ltd., Sheffield, steel files, tool steel; Marple and Gillott, Ltd., Sheffield, steel springs, copper cable and small gun metal and brass. Among the tenders accepted for the supply of stores for the electrical department for one year were the following: Morgan Crucible Company, Ltd., crucibles; Bullers, Ltd., insulators; Doulton and Company, Ltd., insulators; W. T. Henley's Telegraph Works Company, Ltd., and Charles Macintosh and Company, Ltd., cables; British Insulated and Helsby Cables, Ltd., tubing and accessories; Simplex Conduits, Ltd., tubing.

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FINANCIAL REPORTS AND MEETINGS.

Ebbw Vale Iron and Coal Company.—The directors recommend a dividend of 15 per cent., less tax, on the ordinary shares for the year ended March 31 last.

Dublin United Tramways.—The directors propose to declare ad interim dividends for the half-year ended June 30, 1917, at the rate of 6 per cent. per annum, less income tax, on the preference shares, and at the rate of 4 per cent. per annum, less income tax, on the ordinary shares. The dividend warrants will be sent out on August 4.

Stalybridge Tramways.—The accounts of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways and Electricity Board for the year ended March 31 last show that the total tramway revenue was £44,186, equal to 9.504*d.* per car mile, while the working expenses were £29,498, or 6.345*d.* per car mile. After paying capital charges, etc., and putting £2,828 to reserve, and crediting £7,000 raised from the Corporations concerned, there is a deficit of £5,202. At the end of the previous year the deficit was £6,734. The number of passengers was 10,016,837, and car mileage 1,115,663.

Sunderland Corporation Tramways.—The Sunderland Corporation tramway receipts during the past year were the highest in the history of the undertaking, being £85,180, or over £6,000 more than the preceding year, while the total number of passengers carried was nearly 2,000,000 more than in any other year, being 21,711,489. Compared with 1898, the first year of the municipal undertaking, those figures show a great advance, the traffic receipts that year being £17,578, and the passengers carried a little over 3,000,000. The total income for the year was £85,513 and from the net profit £5,000 has been given to the relief of the rates, bringing the total sum applied in that way to £62,027.

The Walthamstow Council Tramways were the first in Greater London to abolish half-penny fares, and the success which followed the adoption of this course is noteworthy. The change first came into operation on April 3, 1916, so that the municipal year ended March 31 last covered, practically, twelve months' operation under the revised table of fares. The result shows an increase in revenue of £9,518; in average receipts per car mile of 1.45*d.*; and a net balance after meeting all liabilities of £6,800, as against £918 for preceding year. This result should be encouraging to those other authorities in London which have more recently adopted a similar policy with regard to fares.

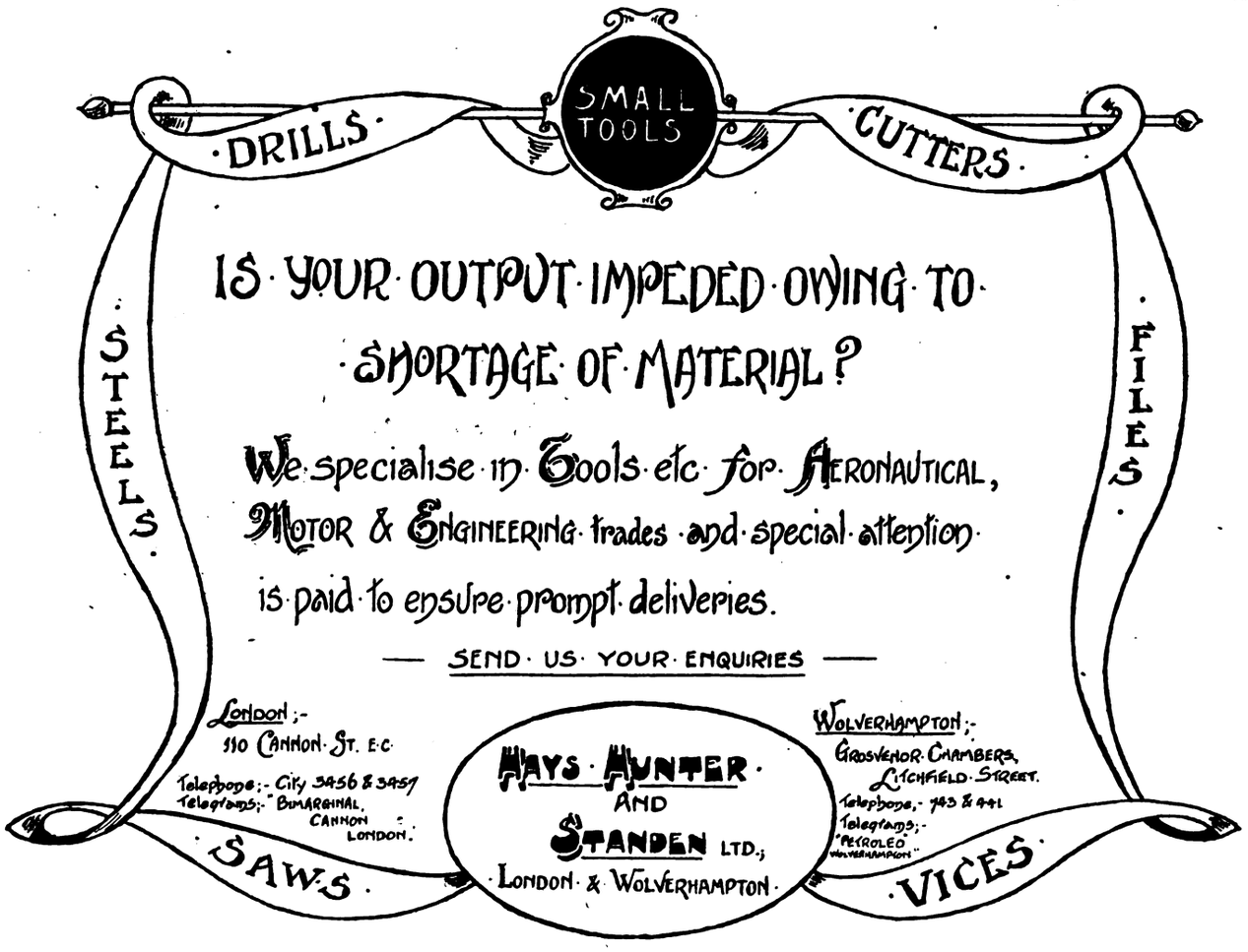
Coventry Corporation Tramways.—Councillor Pugh, chairman of the Tramways Committee, in presenting the report of the department to the Town Council, said that there was a surplus of £7,667, and after writing off £1,033 as motor omnibus capital expenditure, and £388 for other items, there was a balance of £6,245, which would be transferred to the reserve and renewals fund. Owing to the increases in wages and the enhanced cost of material, it was impossible to recommend the allocation of any sum to the relief of rates this year. Considering all the difficulties of carrying on with the shortage of labour and material, he thought that the travelling public had much reason for gratitude to the manager and staff of the department. He also expressed appreciation of the splendid services rendered by the women. He had to warn the public that the increased wages would inevitably involve some readjustment of the tramway fares. Councillor Wale, in seconding the adoption of the report, remarked that the traffic problem of the city was one which must require very serious consideration in the future. He contended that by pursuance of the financial policy inaugurated by Councillor Pridmore the Council would confer a great benefit on the citizens, and ultimately be able to provide a tramway system second to none.

Imperial Tramways Company.—Presiding at the ordinary meeting of this company in Bristol on June 27, Mr. Samuel White moved the adoption of the directors' report, and made feeling reference to the death of his brother, Sir George White, former chairman of the company. With regard to the Middlesbrough, Stockton, and Thornaby Tramways, though they carried more than half a million additional passengers, and their receipts exceeded £70,000 for the first time, there had been a considerable increase in the working expenses, with the result that the net revenue was over £1,000 below that of the previous year. The greatest credit was due to Mr. Freshwater, their manager, for the excellent manner in which he had discharged his trying duties. The Corris Railway had suffered from the abnormal conditions of the times. They had begun to build up a tourist traffic, but that had been knocked on the head. Their income for the year was £23,073, of which £14,228 was derived from the working of the Middlesbrough undertaking and the balance from dividends upon their other investments. It was sufficient to enable them to pay the 6 per cent. dividend upon their preference shares, interest upon their debenture stock, a dividend of 2 per cent. upon the ordinary capital, and to carry forward £123 19*s.* 10*d.* to the next account. When they returned to normal times there was no reason why things should not improve, and their business become extremely profitable. They could look forward with some degree of confidence to a better return upon their investments in the future. The report was adopted.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended June 23 give total receipts of £203,014, or £21,457 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £94 14*s.* 8*d.* per mile of single track, and last year at the rate of £84 14*s.* 5*d.*, thus showing an increase for the week of £10 0*s.* 3*d.* per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.



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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH, JULY 5, orprevious	A WEEK AGO.
5%	5%	AlabamaTraction5% 1st Mt....	—	67	76½	75½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	58/9	57/6
4%	4%	Do. 4% Deb. ...	100	91	67½	68½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	75
5%	5%	Do. 5% Deb. ...	100	96	68½	68½
1/-	7d.	Auckland Elec. Trams. Ord....	1	1⅝	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	91½	91½
7%	7%	Barcelona Trac. 7% 50 yr. Pr. Lien	100	—	103½	103½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref....	10	11½	9²⁷/₃₂	9²⁷/₃₂
4½%	4½%	Do. 4½% Deb.	100	96	77½	77½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord.	$100	66	48¼	48¼
$1½	$1½	Do. 6% Cum. Pref. ...	$100	97	90	89
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref.	5	5	82/6	78/6
4½%	4½%	Do. 4½% 1st Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	28	28
6%	5%	Do. Pref. Ord.	100	106	31½	31½
5%	5%	Do. 5% Cum. Pref. ...	100	103	55	56
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	86½	86½
4½%	4½%	Do. 4½% Perp. Con. Deb ...	100	96½	57	56
£3*	£3*	Brit. Elec. Trac. Ord. ...	100	—	29	31½
6%	6%	Do. 6% Cum. Part. Pref....	100	—	72	74½
5%	5%	Do. 5% Deb.	100	92	75	76
4½%	4½%	Do. 4½% 2nd Deb.... ...	100	77½	65	65
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	80	80
3/-	6/6*	Calcutta Tramways Ord. ...	5	7½	6⅛	6⅛
1/3	1/3	City of B.A. Trams.	5	5½	81/3	83/1½
4/-	5/-	Dublin United Trams. Ord. ...	10	8	7⅜	7⅜
6/-	6/-	Do. 6% Pref.	10	12	10½	10½
5%	5%	HongKongTrams.5%Mt.Debs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	19/9	19/9
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord. ...	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams. Co. ...	10	10½	9½	9½
5%	5%	Lisbon Elec Trams 5% Mt.Debs	100	95	79½	79½
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	Lond. & Sub. Traction Ord....	1	1⅝	1/10½	1/10½
6d.	6d.	Do. 5% Pref.	1	7/8	6/10½	6/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64½	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	80½	82½
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	78½
4%	4%	Lon. Unt.Trams.4%1st Mt.Db.	100	55	33½	34
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅞	85/-	85/-
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	70	70
$1½	$1½	Manila Elec. R. R. & Light...	$100	102	64½	64½
4½%	4½%	Met. Elec. Trams. 4½% Deb.	100	85½	71	71
$1½	$1½	Mexico Trams. Common ...	$100	70	23	23
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	38	36
6%	6%	Do. 6% Mt. Bds.... ...	100	76	29½	29½
4½%	4½%	MontrealSt.4½%Stg.Dbs(1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ...	100	99	92	92
1/2½*	2/-	National Steam Car	1	½	19/9	19/9
9¾d.*	9¾d.*	New General Traction ...	1	⅜	7/3	7/3
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	⅜	13/3½	13/3½
5/-	6/-*	Para Elec. Rlys. Ord.	5	4½	73/1½	73/1½
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Trams.5% Pref.	1	⅛	10/7½	10/7½
1/4	8d.	Provincial Trams. Ord. ...	1	¼	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. ... 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	85½	87½
5%	5%	1st Mt. 5% 50 yr.	100	89½	75½	76½
5%	5%	Sao Paulo Deb. 5% 1st Mt....	$500	99	89½	88
5%	5%	Do. 5% Perp. Deb. ...	100	99½	74½	74½
—	3d.	Singapore Elec. Trams. ...	5/-	¼	5/3	5/3
5%	5%	S. Elec. Trams. of B.A. 5% Mt.	—	100½	94	94
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93½	93½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	79	79
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	69	69
—	—	Yorks.(W.R.) Elec.Trams. Ord.	5	¼	17/-	17/-
3/-	3/-	Do. 6% Cum. Pref. ...	5	¾	84/6	83/3
—	—	Metropolitan Dist. Ord. ...	100	21½	16½	16½
—	—	Undgd. Elec. Rys. of London...	10	21½	35/9	36/3
		Do. "A"	1/-	¾	5/7½	5/7½
4½%	4½%	Do. 4½% Bds. of 1933 Rd....	—	99	99½	99½
6%	6%	Do. 6% 1st Cum. In. Db....	100	114	99½	99½
6%	4%	Do. 6% In. Bonds Rd. ...	—	88½	83½	83

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915-16	Latest Return. 1916-17	Aggregate. Wks.	Aggregate. 1916-17	Increase or Dec.
Anglo-Argentine ...	July 1	£46,726	£49,639	26	£1,337,059	+ £11,000
Auckland ... (28 days)	June 1	21,152	21,742	48	259,101	+ 6,043
Ballarat and Bendigo ...	Apr. 22	3,727	4,611	4	4,611	+ 884
Brazilian Traction Mlrs.	May	7,304,000	7,864,000	21	37,004,000	+ 3,003,000
Brisbane	Apr.	32,575	31,620	17	127,780	— 1,670
British Columbia $	May	414,215	438,919	47	4,952,727	+ 290,427
Buenos Aires Lacroze ...	June	36,213	38,020	52	464,077	— 25,457
BurmahTram.&LightRs	May	23,585	24,906	44	257,416	+ 27,698
Calcutta ... Rs.	June 30	66,388	65,382	26	1,750,442	+ 19,840
Cape Town	May	...	15,867	21	84,829	...
Carthagena & Herrerias	June	3,512	5,325	26	24,172	+ 7,803
Cordoba	Mar.	13,598	13,098	52	160,683	— 1,223
Costa Rica	Dec.	3,871	3,182	...	...	...
East India	June	2,285	1,186	48	20,326	— 2,824
Hong Kong $ 10 Mar. to	May 12	138,638	123,523	19	250,253	— 4,574
Kalgoorlie	Mar.	2,479	2,772	13	7,396	+ 433
La Plata	June	3,735	3,852	26	25,144	— 781
Lima	Apr.	33,542	37,807	17	67,785	+ 3,684
Lisbon ... ... Escu.	May	...	233,765	...	...	...
Madras ... (2 weeks) Rs.	June 30	29,250	32,492	26	408,416	+ 38,074
Manila ... ... $	May	53,900	61,500	...	...	...
Manaos ... ... Rs.	Mar.	...	161,156	...	...	...
Melbourne	Mar.	63,000	64,506	13	186,321	— 9,179
Montevideo	June	25,300	27,458	35	242,790	+ 1,728
Pernambuco	July 1	2,821	3,694	25	94,754	+ 17,769
Peruvian ... $	June	929,500	965,420	52	11,128,092	+ 1,304,595
Port Elizabeth ...	May	...	3,494	21	19,877	...
Rangoon	May	4,589	4,737	21	25,237	+ 861
Shanghai ... $	Apr. 25	25,305	12,610	...	...	...
Singapore ... $	May 19	13,139	13,129	20	262,850	+ 25,591
Toronto ... ... $	May	903,924	992,460	21	4,889,055	+ 438,347
Winnipeg	May	276,980	259,794	21	1,419,144	— 27,644

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1916	Latest Return. 1917	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917.	Aggregate. Incr. or Dec.
Aberdare U.D.C. ...	June 26	353	394	+ 41	12	£5,233	+ £457
Aberdeen Corporation ...	„ 27	1,834	2,230	+ 396	4	8,675	+ 1,361
Accrington Corp. ...	*	...	...	...	...	...	...
Ayr Corporation ...	„ 30	385	524	+ 138	7	2,869	+ 232
Belfast City	„ 29	5,084	6,429	+ 625	13	78,438	+ 5,723
Birkenhead Corp. ...	July 1	1,567	1,903	+ 336	13½	22,799	+ 2,916
Birmingham Corp. ...	June 23	16,250	17,718	+ 1,468	12	210,949	+ 12,315
Do. Motor Omnibuses	„ 23	1,007	936	— 71	12	10,630	+ 700
Blackburn Corp. ...	„ 27	1,263	1,364	+ 101	13⅔	19,600	+ 2,277
Blackpool & Fleetwood ...	„ 30	892	986	+ 94	25	12,850	— 572
Blackpool Corp. ...	*	...	...	...	...	...	...
Bolton Corporation ...	„ 24	2,957	3,172	+ 215	12	38,939	+ 3,113
Bournemouth Corp. ...	July 4	2,304	2,403	+ 99	13	30,936	+ 352
Bradford Corporation ...	June 30	6,551	7,817	+ 1,266	13	97,562	+ 8,161
Brighton Corporation ...	July 1	1,236	1,419	+ 183	13½	17,496	+ 2,206
Bristol	June 29	4,916	5,472	+ 556	25	131,206	+ 9,489
British Elec. Federation	*	...	...	...	...	...	...
Burnley Corporation ...	„ 30	1,601	1,796	+ 195	...	...	...
Burton-on-Trent Corp.	July 1	270	298	+ 28	23	3,669	+ 221
Bury Corporation ...	„ 1	1,344	1,698	+ 354	13½	21,525	+ 2,023
Cardiff Corporation ...	*	...	...	...	...	...	...
Chatham & District ...	June 28	1,317	1,396	+ 79	26	31,620	+ 2,090
Chesterfield Corp. ...	*	...	...	...	...	...	...
Colne Corporation ...	*	...	...	...	...	...	...
Cork Electric	„ 28	567	634	+ 267	26	13,109	+ 693
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporaton ...	„ 30	1,114	1,168	+ 53	13	14,963	+ 13
Dover Corporation ...	*	...	...	...	...	...	...
Dublin & Lucan ...	„ 15	179	198	+ 19	24	3,404	+ 306
Dublin United... ...	„ 29	7,274	7,528	+ 254	26	103,977	+ 19,599
Dundee City	„ 27	1,378	1,530	+ 152	6½	9,319	+ 760
East Ham Corporation	„ 30	1,388	1,422	+ 34	13	18,599	+ 1,489
Exeter Corporation ...	„ 29	389	392	+ 3	13	4,919	— 3
Glasgow Corporation ...	„ 30	23,065	27,448	+ 4,383	4⅔	119,019	+ 16,371
Glasgow Subway ...	*	...	...	...	...	...	...
Glossop (U.Elec Supp.)	„ 30	134	152	+ 18	26	3,618	+ 153
Halifax Corporation ...	„ 26	2,234	2,455	+ 221	12⅔	30,206	+ 1,593
Do. Motor Omnibuses	„ 26	50	43	— 7	12⅔	530	— 62
Hastings & District ...	July 1	1,042	1,324	+ 282	26	26,930	+ 4,572
Huddersfield Corp. ...	June 30	2,833	3,223	+ 390	13	41,053	+ 3,094
Hull Corporation	„ 30	3,184	3,319	+ 134	18	42,824	+ 2,096
Ilford U.D.C.	„ 30	746	775	+ 29	13	9,753	+ 780
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	„ 30	625	698	+ 73	13	8,004	+ 1,092
Isle of Thanet... ...	„ 30	384	386	+ 2	39	10,704	— 151
Kilmarnock Corp. ...	„ 30	169	183	+ 14	6½	1,191	+ 57
Lanarkshire	„ 28	2,372	2,929	+ 557	26	66,869	+ 9,528
Lancashire United ...	„ 27	1,851	2,316	+ 465	26	53,073	+ 8,924
Leeds City	„ 30	9,764	10,958	+ 1,194	13	140,860	+ 14,761
Leicester Corporation...	*	...	...	...	...	...	...
Leith Corporation ...	„ 30	850	1,070	+ 220	6½	6,889	+ 1,218
Leyton U.D.C. ...	„ 28	1,753	1,816	+ 63	13	24,719	+ 3,376
Liverpool Corporation ...	„ 23	14,468	16,228	+ 1,760	24⅔	367,036	+ 28,606
Llandudno&Colwyn Bay	„ 22	447	393	— 54	29½	6,845	— 592
London County Council	July 4	49,616	56,630	+ 7,014	13½	742,228	+ 92,592
London Genl. Omnibus...	*	...	...	...	...	...	...
London United... ...	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	June 28	210	239	+ 29	13	2,990	+ 212
Manchester Corp. ...	„ 30	20,674	19,280	— 1,394	13	263,783	+ 18,690
Met. Elec. Trays. ...	*	...	...	...	...	...	...
National Steam Car ...	*	...	...	...	...	...	...
Nelson Corporation ...	„ 23	203	219	+ 16	12	2,740	+ 75
N'castle-on-Tyne Corp. ...	„ 30	6,753	8,158	+ 1,405	13	98,767	+ 16,029
Newport (Mon.) Corp....	*	...	...	...	...	...	...
New St. Helens & Dist.	„ 27	1,039	1,330	+ 291	52	59,627	+ 7,794
Northampton Corp. ...	„ 29	701	805	+ 104	13	10,168	+ 1,135
Nottingham Corp. ...	„ 28	3,907	4,197	+ 290	13	53,561	+ 4,184
Oldham Corporation ...	July 2	2,400	2,895	+ 495	14	39,166	+ 3,486
Portsmouth Corp. ...	June 30	2,754	2,925	+ 171	...	...	...
Preston Corporation ...	„ 27	1,042	1,166	+ 124	12½	14,647	+ 834
Provincial	„ 30	2,464	2,483	+ 19	39	83,443	— 22
Reading Corporation ...	„ 28	836	987	+ 151	12⅔	12,471	+ 2,010
Rhondda Tramways ...	„ 28	1,294	1,501	+ 207	26	36,700	+ 5,211
Rochdale Corporation...	„ 30	1,647	2,035	+ 388	13	26,833	+ 2,730
Rotherham Corp. ...	July 4	1,571	1,774	+ 203	13⅔	23,521	+ 3,965
Salford Corporation ...	„ 2	5,654	6,983	+ 1,329	13⅔	85,760	+ 12,471
Sheffield Corporation ...	„ 1	10,742	11,861	+ 1,119	14	162,400	+ 17,785
Southampton Corp. ...	June 29	1,679	1,976	+ 297	12½	23,584	+ 3,459
Southend-on-Sea Corp.	„ 27	896	985	+ 89	13	11,397	+ 1,180
South Met. Trays. ...	*	...	...	...	...	...	...
South Shields Corp. ...	„ 30	810	1,172	+ 362	13	12,020	+ 1,729
Sunderland Corp. ...	July 1	1,614	1,914	+ 300	13	22,869	+ 2,125
Sunderland District ...	June 20	606	794	+ 188	34	22,524	+ 2,869
Swindon Corporation ...	„ 27	198	258	+ 60	12⅔	3,303	+ 811
Torquay Tramways ...	„ 28	593	671	+ 78	26	13,768	+ 1,010
Tyneside Trys. & Tmrds.	„ 20	667	1,035	+ 368	25	17,867	+ 4,525
Wallasey Corporation ...	„ 30	1,388	1,588	+ 200	13½	19,004	+ 1,485
Walsall Corporation ...	„ 30	827	911	+ 84	13	12,046	+ 1,075
Walthamstow U.D. ...	„ 23	1,127	1,242	+ 115	12	15,008	+ 2,157
Warrington Corp. ...	July 7	466	533	+ 67	10	4,825	+ 230
West Ham Corporation...	June 28	3,304	3,647	+ 343	12⅔	47,157	+ 5,189
Wigan Corporation ...	„ 21	1,054	1,921	+ 267	3	22,379	+ 2,447
Yorkshire (W. Riding)...	July 1	1,870	2,141	+ 271	26	51,659	+ 7,840

* Issue of Traffic Returns suspended during the War.

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TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
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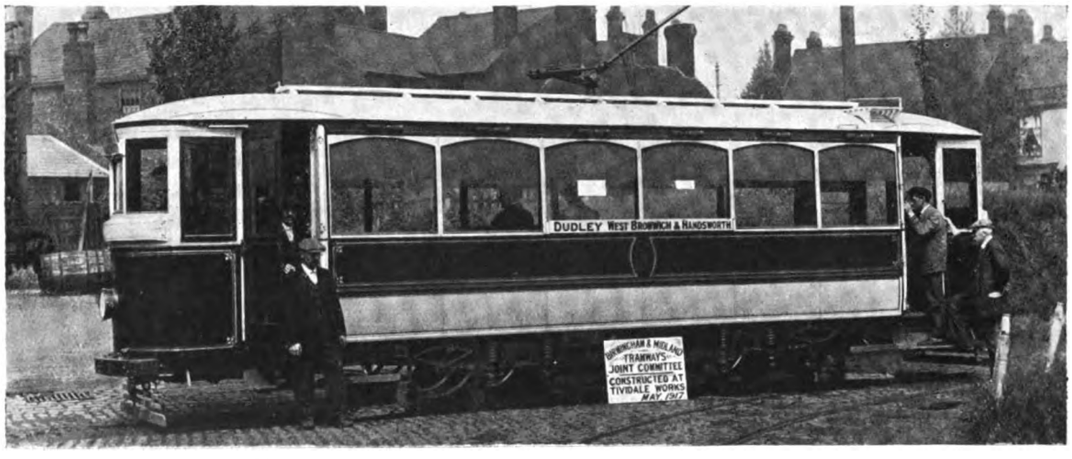
THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, JULY 12, 1917. VOL. XLII.

NEW TYPE OF SINGLE-DECK CAR.

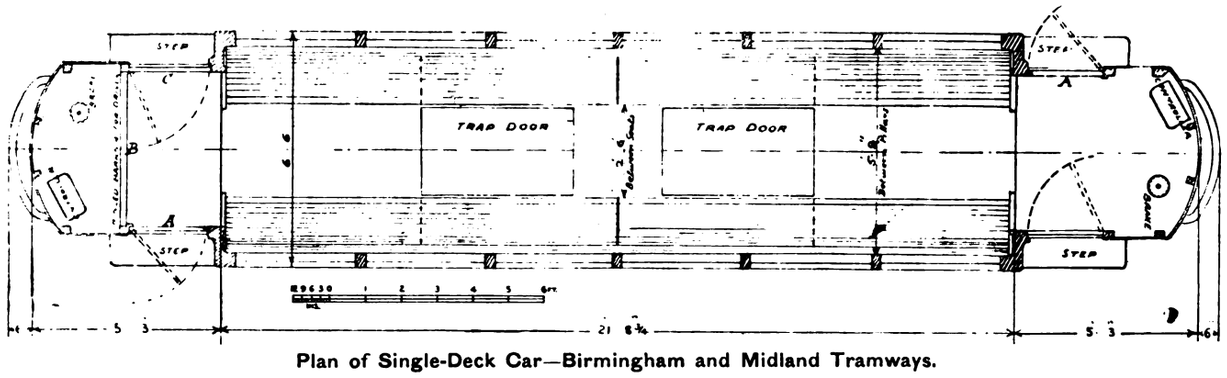
A car presenting a number of novel features of a most practical character has recently been designed and constructed in the Tividale Works of the Birmingham and Midland Tramways Joint Committee by Mr. R. Humphries, tramway engineer to the committee. The gauge of the Black Country Tramways is only 3 ft. 6 in., and experience has shown that the racking stresses of double-deck cars, especially when they are top-covered cars, on this gauge, are very severe. This is especially the case on single track with loops, as it will be readily recognised that the frequent and continual swerving of the car in motion tends to dismember it. The higher the centre of gravity of the car, the more severe and detrimental these stresses become.


DUDLEY WEST BROMWICH & HANDSWORTH
BIRMINGHAM & MIDLAND TRAMWAYS JOINT COMMITTEE CONSTRUCTED AT TIVIDALE WORKS MAY 1917

Single-Deck Car—Birmingham and Midland Tramways.

The accompanying view and plan shows the main points of the Tividale car. The objects in view have been (*a*) light superstructure, (*b*) absence of all unnecessary doors and partitions, and (*c*) maximum carrying capacity (both normal and overload) for a minimum weight and cost. The car body proper is 21 ft. 9 in. long, with longitudinal seating for 17 on each side. The platforms are 5 ft. 3 in. in length, thus making the total length of car 32 ft. 3 in. This is considered to be the maximum length desirable on two axles, the truck wheel base being 8 ft. 6 in.

To come to the actual novelties in design and construction, first among these is the absence of bulkhead doors. It will be seen that as soon as passengers mount the platform they are in the car, and do not have to wend their way through other doors. This gives a decidedly Pullman effect to the inside of the car, and adds wonderfully to its roominess. In the opinion of the designer, the bulkhead is a relic of the old open-fronted platform. In these days, when the platform staff insist on covered fronts, the days of the bulkhead are numbered. The complete vestibule gives shelter in all weathers and seasons to both staff and passengers, and the overload capacity is quite



Plan of Single-Deck Car—Birmingham and Midland Tramways.

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100 per cent., still leaving space for the conductress to carry out her duties. The protection afforded to both driver and conductress should enable them in the winter to carry out their work without swathing themselves up from head to foot in wrappings not conducive either to good driving or good conducting.

The near side front exit enables traffic to be handled expeditiously, and separates outgoing from incoming passengers. This also has the benefit of inducing passengers to file up to the front end of the car, thus filling the vehicle and distributing the load. The door of the exit "A" is under the control of the driver, and is not released until the car is brought to a stand. This door opens outwards, and automatically closes after the passenger leaves the step. The opening of the door is a danger signal to approaching traffic, and will at once draw attention to the dismounting passenger. An additional safeguard at night time is given in the shape of a lamp placed right over the step, so that the alighting passenger is visible at all times.

The hinged barrier " B " behind the driver is made to fasten the off-side door so that a passenger cannot open this door and alight on the " devil strip." The same remark holds good when the door "A" is on the off-side; it is then locked against use, and a seat for the conductress is fitted beside it. This seat on the reversal of direction of the car is taken to the opposite end, and the driver's barrier folds up against the sidepillar.

The vision of the driver for night work is guarded against reflected light by means of a roller blind which drops behind him on to the top of the barrier " B." The door " C," when on the rear end, is made to fold back against the inside of the vestibule, thus giving a very roomy platform. In very cold weather this door can, of course, be closed, and the vehicle will then be weather-tight.

The ventilation of the car has been proved by practical experience to be excellent in all sorts and conditions of weather. Ventilation is carried out by a row of torpedo-catchers over the side windows, and a hinged window on the left hand of the driver gives additional ventilation when required.

The car has been very well received by the public; its current consumption is extremely low, and its acceleration high, and it is as highly thought of by the traffic staff as it is by the engineering staff.

The engineering and electrical details of this car are as follows:—The controllers are fitted with a rheostatic brake attachment, and the trolley-tapping is in parallel through an automatic switch at both ends of the car. Advantage has been taken of the covered platform to run the cables on the top instead of underneath the platform, so that these are not exposed as in standard practice to the accumulated mud and wet underneath the platform. The axles are equipped with gear centres hydraulically pressed on instead of keyed. This has been standard practice for a number of years on the Black Country Tramways with most satisfactory results. The gear rim is renewable, and bolted on in two halves. The motors fitted are G.E. 58, 4-turn, giving 37·5 H.P. each, so that the equipment is fit for all the grades found in the Black Country. Finally, the absence of the monitor roof enables the car to operate on routes that pass under low railway bridges. The car is finished in a severely plain style throughout, and great attention has been paid to the avoidance of all dust-traps and inaccessible receptacles for used tickets, etc. Not the least of the merits of the design is that it can be cleaned out with a minimum of labour in a minimum of time.

The car was inspected by Lieut.-Col. Druitt, of the Board of Trade, on June 21, and passed for general service, and at the request of the Birmingham Corporation immediately commenced to run on the Black Country through service into Colmore Row, Birmingham.

SOME VITAL FACTORS IN TRAMWAY OPERATION.

By DAVID MCCOLL
(General Manager, Shanghai Tramways).

In your issue of February 17 I have read, with unusual interest, the article headed " Halfpenny Fares on Tramways," by "A Special Correspondent." With his contention as to the importance of the rate per mile of each fare I agree. Considered in this way, the ½d. fare in London is much dearer per mile than the 1d. fare. In Glasgow the ½d. fare, the average distance for which is now 1·15 miles, is at the same rate per mile as the 1d. fare. Formerly in Glasgow the ½d. fare was at more than double the rate per mile of the 1d. fare.

The considerations advanced by your correspondent regarding the advantages of ½d. fares, under suitable conditions, state principles which my experience has taught me are sound. His remarks, however, regarding the highest average load per car attainable on the London County Council Tramways, and also as to the fixity of costs per car-mile, are less easy to accept. Dealing with the first of these two points, he lays it down that " On the London County Council Tramways the average load of a car at any point on the highest possible reckoning is only 23 passengers, even in these days of overcrowding." As your correspondent has used this average of 23 in conjunction with what he reckons to be the necessary average fare which should have been charged per mile in order to yield the car-mile earnings of 13·14d., which he indicates were required to enable the London County Council Tramways to meet all contingencies for that year, it is bound to be on the basis of average distance paid for, not average distance actually travelled—two somewhat different things. If the figure of 23 passengers per car (in other words, 23 passenger miles paid for per car-mile) is correct, it means that, as practically all the London County Council cars are seated, I understand, for 74, your correspondent considers that, if 31 per cent. of the seating accommodation provided is paid for, the best possible average is attained. This 23, divided by 11·39 (passengers per car-mile, 1915-16), gives 2·02 miles as the average distance paid for—which seems rather high in view of the enormous volume of traffic at very short distances and of the more convenient facilities provided by the railways for the longer distance traffic. However, as the average receipt per passenger for 1915-16 was 1·03d., this figure, divided by the deduced figure of 2·02 miles, gives 0·51d. as the average receipt per passenger-mile paid for. Twenty-three multiplied by 0·51d. gives 11·73d., the actual car-mile earnings for 1915-16. But the reliability of these derived figures of average distance paid for and average receipt per passenger-mile paid for depends, of course, upon the accuracy of your correspondent's figure of 23 passengers per car. I have no data as to the average distance at each fare and the number of passengers at each fare for the London County Council Tramways to enable me to work out the actual passengers per car (or passenger-miles paid for per car-mile). But your correspondent gives, for the Glasgow tramways, the figure " 28 passengers per car," which, with cars seated for 62, means that slightly over 45 per cent. of the seating accommodation

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provided was paid for. To test this, I have worked out the actual Glasgow figure for 1915-16 as follows :—

Fare.	Average Distance (Miles)	Passengers (Millions).	Passenger Miles Paid for (Millions).
½d....	1·15 ...	233 ...	267·95
1d....	2·31 ...	94	217·14
1½d.	3·46 ...	22 ...	76·12
2d....	4·62 ...	7 ...	32·34
2½d.	5·75 ...	3 ...	17·25
3d. and over	6·50 (say)	3 ...	19·50
		362 ...	630·30

Passenger Miles Paid for (Millions).		Passengers (Millions).		
630·30	÷	362	=	1·74 miles paid for per passenger.

Average Fare per Passenger.		Miles Paid for per passenger (as above).		Average Receipt per Passenger Mile paid for.
Then 0·761d.	÷	1·74	=	0·44d.

The figure of 0·44d. brought out above as the average receipt per passenger-mile paid for agrees with the figure for the average fare charged per mile, as given in the Glasgow Annual Report for 1915-16. Naturally this would be so, as all the Glasgow fares (contrary to what is the case in some other cities) are at the same rate per mile. The figure of 1·74 brought out as the miles paid for per passenger is thus proved, and puts beyond doubt the percentage of seating accommodation paid for in Glasgow, because all that remains is to multiply 1·74 by 14·516 (passengers per car-mile), which gives 25·26 as the passenger-miles paid for per car-mile (termed "passengers per car" by your correspondent) instead of 28 as stated by him. This 25·26 is equal to 40·74 per cent. of the seating accommodation, as compared with 31 per cent. suggested by your correspondent as the London figure. But, as he has overstated the Glasgow figure, it is possible he may also have overstated the London figure, which may actually be less than 31 per cent.

The average distance actually travelled is obviously, however, on all undertakings less than the average distance paid for, and the former is the effective factor to be used in considering whether the average occupancy is adequate or not. This point can readily be illustrated from the Glasgow figures ; when the distance there for the halfpenny fare was half-a-mile, there were nearly 70 million halfpenny passengers per annum, and doubtless most of these still travel only half-a-mile. Then many millions more who pay ½d. (the total at that fare for 1915-16 was 233 millions) probably travel different distances between half-a-mile and the average ½d. average of 1·15 miles. Similarly, although an average distance of 2·31 miles is given for 1d., millions of 1d. passengers are bound to travel different distances between 2·31 miles and something not much beyond the ½d. distance of 1·15 miles.

The same principle applies to the higher fares, although the ratio of average distance untravelled to average distance given at each of the higher fares diminishes as the fare increases. It is evident, after making such allowances, the average distance actually travelled in Glasgow for 1915-16 is unlikely to have exceeded 1·4 miles. Therefore 14·615 passengers per car-mile (1915-16) × 1·4 miles, assumed as the average travelled per passenger = 20·32 passenger-miles per car-mile (or with cars seated for 62, an occupancy of 32·77 per cent.).

Although the occupancy of the Glasgow cars is probably as high as that of any undertaking in the United Kingdom (and, apparently, higher than most), it does not appear from the above calculations to be more than one-third (very much less than that of the former horse-cars) ; and it is not, I think, claimed by the management that this occupancy is incapable of being raised without increase of standing passengers and without causing inconvenience to the public.

It is clear that the ratio of seating accommodation paid for to seating accommodation provided is distinctly lower for the London Council Tramways than for the Glasgow undertaking, and it does seem that this factor is capable of improvement in London (without increase of standing passengers and without inconvenience to the public) to such an extent as to yield at least the higher car-mile earnings stipulated by your correspondent. It is to be noted that a good beginning in improved occupancy of the London County Council cars has already been made in 1915-16 over the previous year, as the following comparison shows :—

	1915-16.	1914-15.
Passengers per car-mile ...	11·39 ...	9·33
Revenue per car-mile ...	11·73d. ...	9·77d.

As a result of this higher occupancy, the financial results of 1915-16 (after eliminating increased war service allowances) were improved by nearly £94,000, as compared with 1914-15. That there is still some distance to go in this direction (still without inconvenience to the public) is suggested by (*a*) the appreciably higher ratio of occupancy of the Glasgow electric cars (as already shown), and (*b*) the very much higher ratio of occupancy of horse-cars (figures as to which are given later). May I add that my own experience of operating electric cars leads towards the same conclusion.

As most people concerned in tramway working are aware, horse-cars in the United Kingdom, although they had only about one-half the seating accommodation of the electric cars which superseded them, carried practically as many passengers per car-mile, notwithstanding the fact that against the number of passengers in the horse-cars being at any time appreciably in excess of the seating accommodation there were obvious considerations which do not apply to electric cars. The percentage of the seating accommodation generally paid for in electric tramcars in the United Kingdom is apparenly little more than half the percentage of the accommodation formerly paid for in horse-cars. I have not beside me the necessary figures for the London County Council Tramways to enable me to give comparisons of the occupancy of horse and electric cars respectively for that undertaking over a range of years, but in this connection I have extracted data from the last annual report of the Glasgow Corporation Tramways. The Glasgow undertaking for practically the first eight years was worked by horse traction ; for that period the average number of passengers per car-mile was 12·7. For the next 14 years, under electric traction, the much larger cars carried only 12·1 passengers per car-mile.

There does not appear to be any material difference in the average distance paid for in electric cars as compared with horse-cars. The horse-cars therefore, carrying slightly more passengers per car-mile with so very much less seating accommodation than the electric cars, showed over-all a much higher ratio of accommodation paid for to accommodation provided. These results are, I suppose, approximately representative of what has happened generally in the cities of the United Kingdom. What is the explanation ? Since the days of horse traction most of the tramway systems in the United Kingdom have been greatly extended, and a considerable proportion of the additional track traverses much less densely populated districts than the track of the horse traction period. The relatively low ratio of occupancy of electric cars is probably due, to a considerable extent, to the service run on such extensions being unduly disproportionate to the traffic available, and also perhaps to the extent to which

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there are practically empty return trips of "rush" hour cars required for single journeys in one direction only. I do not venture to criticise municipal policy as regards the frequency of services given at places and times of scanty traffic, especially when the undertaking as a whole is profitable; but it is important to avoid confusing (as your correspondent seems to have done) the actual ratio of accommodation paid for to accommodation provided with the conveniently possible ratio on the basis of routes, time tables, etc., planned to minimise waste car-mileage. In addition to the question of adjustment of routes and time tables so as to avoid possible over-service on outlying lines, there is, as already suggested, that of eliminating, as far as practicable, empty or almost empty return trips of cars required only for single-trip, one-direction "rush" traffic. Cars stored during slack hours near where the "in" rush finishes would be certain to be ready where wanted for the next "out" rush, and vice-versa, because the "in" and "out" rushes regularly alternate.

Your correspondent declares that the London County Council Tramways required to earn 13·14d. per car-mile for 1915-16 in order to meet all contingencies, instead of only 11·73d. actually earned. Without the benefits of general trailer car working (to which I shall refer later), the undertaking does appear to have required such earnings. Although the receipts per mile of route were £15,600, as compared with only £11,571 for Glasgow, the capital expenditure per mile of route is about two-and-a-half times that of the Glasgow undertaking, and this necessitates substantially higher car-mile earnings in addition to much higher earnings per mile of route. Assuming, however, that your correspondent is correct in stating that 31 per cent. of the seating accommodation provided on the London County Council cars was paid for in 1915-16 (the meaning of his figure of 23 average passengers per car), if 40·74 per cent. of the seating accommodation had been paid for, as in Glasgow, the total receipts per car-mile would have been 15·41d. with the present fares. If only 34·72 per cent. of the seating accommodation had been paid for (well under the Glasgow figure), your correspondent's stipulated total receipts per car-mile of 13·14d. would have been realised with the present fares. This means that on the average only two and two-thirds more of the 74 seats would have had to be paid for than your correspondent suggests was done. (These car-mile figures are, of course, subject to slight correction due to the fact that when car mileage is reduced all items of expenditure are not reduced *pro rata*, just as also, when car-mileage is increased, all items of expenditure are not increased *pro rata*.)

For the Shanghai tramways the ratio of seating accommodation paid for to seating accommodation provided was over 60 per cent. last year. Owing to the cars being of different types and capacities, this figure has to be arrived at on a seat-mile basis. This high ratio is explained partly by a steady all-day traffic having been cultivated on most routes, the conditions being more favourable for this than they are in the cities of the United Kingdom, and partly to studied adjustment of routes and services to traffic requirements, according to time and place. To show that the high ratio of 60 per cent. is not due to a starved service, it is worth mentioning that the Shanghai number of passengers carried per mile of route is even higher than the high total of the London County Council Tramways. It is not suggested that anything approaching 60 per cent. is attainable in the United Kingdom, but this experience is mentioned to give point to the suggestion of the possibility of something like 35 per cent. being conveniently reached and maintained in London, with the important result of placing the finances of the London County Council undertaking on an indisputably sound basis.

Your correspondent appears to have assumed the present occupancy as a fixity incapable of increase, and that therefore, as higher car-mile earnings are required, they can only be obtained by means of higher fares. Logically, the doubling (practically) of the seating accommodation per car, due to the introduction of electric traction, should permit of an appreciable addition to the average load per car.

The two factors of rate of fare and occupancy are really mutually dependent; the rate of fare may or may not be such as to produce the volume requisite for adequate occupancy, whilst the occupancy of the cars which is reasonably possible, having regard to their accommodation, influences the rate of fare which can be charged. Of the two factors that of occupancy seems at present, for such an undertaking as the London County Council Tramways, to possess the greater possibilities. It would be unwise, however, to attempt to lay down any arbitrary figures as generally attainable because conditions are so dissimilar in different places; actual experiments with both factors are usually the best means of arriving at the most suitable arrangements.

With regard to the inclusive cost per car-mile which, also, your correspondent is inclined to assume as a fixity for the London County Council Tramways, I submit that, in view of the contemplated extensive development of trailer working by that undertaking and of the very low capital and working costs of trailer cars as compared with motor cars, the inclusive cost per car-mile should certainly be capable of substantial reduction below the 1915-16 figure. Your correspondent suggests that the London County Council fares require to be increased if the necessary car-mile earnings are to be obtained. Before this can be accepted, he must prove that the present ratio of accommodation paid for to accommodation provided cannot be conveniently increased. It must also be taken into account that to increase fares might be to restrict the volume of traffic, and thus interfere with trailer development, which is so important to the future of the London County Council undertaking.

A concrete example of the advantages of trailer working is afforded by the experience of the Shanghai Tramways: for 1910 our ratio of trailer car-miles to motor car-miles was only 5 per cent. (trailers were only then being introduced); for 1916 this ratio had risen to 60 per cent. (although the motor car-miles per mile of route had been substantially increased), causing working expenses per car-mile (total mileage) to fall by 23 per cent. in the same years. Moreover, there had been considerable economy in capital expenditure by the general employment of trailers. It is perhaps worth adding that the receipts per trailer car-mile are practically the same as the receipts per motor car-mile, and that receipts per car-mile (total mileage) for 1916 were 10 per cent. higher than for 1910.

I have written this article in no spirit of mere controversy—it is my first communication to THE TRAMWAY AND RAILWAY WORLD, although I have been connected with traction in different forms for over twenty years—but because the whole problem suggested by your correspondent's article is one of the first importance, and because my long study and experience of that problem, in different cities and under different conditions, in the United Kingdom and abroad, have led me to conclusions which are perhaps of such interest and significance as to warrant their being put on record in your columns.

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LONDON COUNTY COUNCIL TRAMWAY FARES.

By A. J. Lawson, M.Inst.C.E.

In the financial year which ended on March 31 last the total revenue of the London County Council's tramways from passenger fares (according to the reports presented at various meetings of the Council) was, in round figures, £2,460,000, or £181,000 more than in 1915-16. Assuming that the average fare per passenger remained the same as in the previous year, viz., 1·003d., the receipts represent about 589,000,000 passengers carried, or an increase of 43,000,000.

The adjusted final figures are to be presented to the Council on July 18, and no doubt will be worthy of study in detail. Whatever the final accounts may show, however, there can be no doubt that they will demonstrate, it is to be hoped even to the complete conviction of all parties on the Council, that the present fares—after allowing for the suspension of the ½d. fares and return tickets—are still altogether inadequate. Let it be borne in mind that each mile of single track tramway in London has cost £46,770 to construct and equip, and that of the total length of lines within the county 2½ miles are leased, leaving 141·67 route miles of double track to be worked by the Council itself, and that the average fare per passenger should not be less than 1·16d. to pay all working expenses and to meet the capital charges, depreciation, and renewals. To put the tramways on the same footing as the Glasgow tramways, having regard to the respective costs, the fare would require to average 1·22d. per passenger; but then Glasgow makes a profit on its tramways, which in a municipally-owned undertaking is no doubt pleasant to the Corporation, though it militates against such cheapening of fares as passengers may claim to be justly entitled to. But London's mismanagement of tramway finance, with inadequate fares and consequent failure to make provision for proper repairs, reconstruction, or renewals is a much worse mistake in the other direction.

The revenue of any undertaking run by a municipality should be so adjusted that after payment of all working expenses and capital charges there should be neither a profit nor a loss.

The Glasgow tramways in the financial year, which ended in May, carried 388,000,000 passengers at an average fare of ·77d. per passenger, which yielded an income of £1,245,000 on approximately 100 route miles of double track, the capital expenditure on which was only £19,370 per track mile, or 41·8 per cent. of the cost of the London lines. This number of passengers was 26,000,000 more than in 1915-16.

At a special meeting of the London County Council held on May 18, 1917, a recommendation of the Highways Committee to "suspend" halfpenny fares and return tickets was carried on a division, the party which prefers philanthropy at the expense of the ratepayers to the business management method of making the tramways pay their way being handsomely defeated. Workmen's tickets at rates that yield less than the cost of working the early morning cars which carry this traffic, and nothing at all towards capital charges, are still retained, though the addition of only ½d. per ticket per day would provide a very slight margin of profit. So also the transfer ticket, over which the Council is defrauded wholesale, is retained, and the proportioning of fares to length of stages remains to be dealt with, after calling in experts to advise the Council, which apparently does not rely upon the opinion of its own officers.

The Highway Committee was at pains to state:—"We are proposing suspension, not abolition, of the fare ratings referred to, as we have no wish to prejudge the question whether (or no) there should be a reversion to them on the resumption of normal conditions—including normal working costs." As normal working costs would probably mean a reversion to pre-war wages of the Council's employees, the reversion to halfpenny fares and return tickets is clearly adjourned *ad Kalendas Græcas*.

The members of the Council who took part in the debate were clearly at a loss to know why, with overloaded cars in the mornings and evenings, and taking all possible traffic, the receipts are insufficient; hence the need of outside expert advice. The Minister of Education might possibly suggest the right kind of expert. In the discussion the terms "30 per cent. of the passengers," "30 per cent. of the traffic," and "30 per cent. of the revenue" were all used, though what was probably intended was to convey the information that 30 per cent. of the total number of passengers travelled on the cars at halfpenny fares, or that 30 per cent. of the traffic yielded only 12 per cent. of the revenue. The management of the tramways was severely commented on, "badly managed," "deliberately mismanaged," and "grossly mismanaged" being among the terms used. If true, the reflection is on the Council, not on the officials or committees. If halfpenny fares were part of the original scheme, why was the very costly slot system adopted? Nobody now would care to have the overhead trolley system in central London; but with the adoption of the conduit system of construction the introduction or retention of halfpenny fares was a mistake. Estimates of cost, traffic, revenue, and fares surely must have been made and presented to the Council; or did the expenditure and the experience "just grow," the Council relying upon municipal ownership as a Providence to provide its daily bread?

"I 'spects so"—and twelve years' experience of tramway working apparently leaves the members with childlike faith that something will turn up to relieve them of the responsibility of deciding anything lest it should be made a "party question," except to increase the working expenses so as to absorb any increase in revenue. And so perhaps it is well that the latter should be underestimated, as it has been in the case of the possible result from the abolition of ½d. fares. Far better results than those foreseen in the estimates recently presented have already been obtained, but the increased costs, being based upon already agreed advances in pay to drivers and conductors, and in heavy salaries, will swallow up the greater part of the increased income, leaving the Council still far short of the means to put the tramways in good physical condition or on a firm financial foundation. This can only be done by raising fares all round, so that the average fare shall not be less than 1·16d. per passenger at least.

One member proposed that as the average fare was only 1·01d. (as he said), the Council should adopt a universal fare of 1d. only, so as to induce more traffic! I wonder if the Council will experiment on this line? *Quien sabe?*

A lady member—Miss Adler—made a plea for the retention of the halfpenny fare at midday to enable poor workgirls to get home to dinner and back in time for work. The use of 1d. return tickets might in such cases be beneficial both to workgirls and lads, and not lessen revenue; but the writer would suggest to Miss Adler and her colleagues who are interested in the welfare of young workpeople that the best way of helping them would be to promote and strive for legislation which will do away with the "sweating"

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of labour of this class, and provide for the payment of a living wage as well as of a margin over bare living expenses which will enable the youth of both sexes to afford even a penny fare for tramway rides to and from dinner at home. The payment of starvation wages to young girls and women especially is a disgrace to London, and mere eleemosynary help in the payment of part of the cost of their fares out of the pockets of other passengers, or even out of those of the ratepayers, neither benefits the recipients of such charity nor removes the stain from the city that permits the wrong. And don't turn all the central parts of the city and inner boroughs into offices, warehouses, and factories; keep some portions for workpeople and others to live and market in; then there will be no need for an hour's journey in the morning to work and another hour's journey or more to return from it. Some of London's outer suburbs are very nice places to live in; but taken all in all they are neither cheaper nor more healthy than central localities from which occasional visits to other districts can be more conveniently made.

The proper housing of the working classes does not necessarily imply the building by the County Council of workmen's dwellings at Tooting and the running of tramways at a loss to bring them to and fro at other people's expense. Luxury will give place to necessity within a measurable period, and the coming inevitable conscription of wealth or capital amassed from profiteering in food, or from very fat Government contracts in war time, will render the payment of fair wages to men and women workers essential and not too difficult of performance in that universal co-operative society in which every member of the community must have a proper share. In that condition of society there will be no room for cranks on the County Council or elsewhere who have attained notoriety—not fame as they fondly imagine—by treating workmen and workwomen as paupers to be provided with cheap rides on the tramcars, because they were not paid a fair wage for a fair day's work to enable them to pay their way out of their own pockets.

THE LONDON POST OFFICE RAILWAY.

Some interesting information was given in the House of Commons on June 5 in regard to the progress of construction of the London Post Office Railway. Mr. Illingworth (Postmaster-General), in his annual review, made on the occasion of the presentation of a vote of £13,480,310 for the Post Office, said that the London Post Office Railway was a very useful scheme which was instituted by Mr. H. Samuel when Postmaster-General. The work on it had been continued slowly during the year. Some people had criticised the continuance of that work during the war, but he thought it would have been unwise to have discontinued it, as the contractors were committed to a very large expenditure. The course the Government had adopted would in the long run turn out to be the cheaper and better way. Only two small sections remained to be finished, one near Liverpool Street and the other between Mount Pleasant and the West Central Post Office. The laying of the permanent way and electrical equipment had been entirely suspended until the end of the war.

Sir C. Hobhouse asked for some information as to the cost of the railway, and said he was certain that when the railway was completed the release of Post Office vehicles from the streets of London would be quite remarkable. There would be a great saving of cost, and also a great convenience to the public. The railway would mean a revolution in the transport of letters throughout the London district.

Mr. Pease (Assistant Postmaster-General), in replying to the discussion, said that tenders for the construction of the tunnel were issued when Sir C. Hobhouse was Postmaster-General. The lowest was accepted, the figure being £668,421. The question of suspending the construction of the tunnel in order to discontinue capital expenditure under war conditions had been considered on several occasions, but the suspension would have considerably increased the outlay on construction in the long run. It was ascertained that the contractors were committed to an expenditure of about £350,000, and that a considerable amount of material had already been delivered or manufactured, or was in process of manufacture, for which payment would have to be made. He thought that the undertaking was likely to be a great success from every point of view. Construction had been much slowed down by shortage of labour and materials, but the work was now near completion. The expenditure on tunnelling up to April 1 was £547,454.

Mr. Illingworth, answering a question in the House of Commons on May 22, stated that at that time 435 men were employed on the tunnel construction. Twenty-five tons of steel and 14,000 tons of cast-iron segments had been used during the year ended March 31 last. By far the greater part of the iron was manufactured before that period, and practically all the steel before the outbreak of war.

AMERICAN ELECTRIC RAILWAYS.

We have recently received the June issue of that eminently useful publication, the Electric Railway Section of the *Commercial and Financial Chronicle*, of New York. This supplement is issued three times a year, and the present number consists of 144 closely printed foolscap size pages, containing financial and other particulars relating to something approaching 2,000 electric railway companies in America, including Canada. Seventeen of the more important systems are illustrated by large scale maps showing all the routes, both urban and inter-urban. These maps can be read in conjunction with the information in the text under the heading of "Road," which gives the length of railway, places in which the lines are situated, types of rails used, number of cars employed, and so forth. The names of the officers are also given. The bulk of the lines are, of course, of the nature of tramways and inter-urban light railways. Perhaps two of the most interesting of the maps are those showing respectively the surface trolley lines and the rapid transit lines of the Brooklyn system. The extraordinary development of electric traction in the United States, when indicated in the way that this publication does, must lead the reader to think out afresh the reasons for such an expansion, the like of which can be found in no other country. The reasons are well enough known, but even those who know them may well marvel at the development attained.

Electricity Bulk Supply.—Mr. G. Roberts, Parliamentary Secretary to the Board of Trade, replying to a question by Mr. P. A. Harris in the House of Commons on June 21, stated that it was not a fact that the Departmental Committee on Electricity had prepared a report in favour of dividing the country into definite areas for the production of electricity.

Car Lighting.—Since the summer began tramways authorities of the Metropolis have been allowed to resume normal lighting of the covered top decks. The concession, which is greatly appreciated by the public, was granted on condition that the lighting circuits are so arranged that with the exception of the traffic lights the whole of the lighting can be switched off when an air raid warning is given. If one or more interior lights are kept on to complete the circuit, they must be kept shrouded, so that no light is visible from outside during the period of a warning.

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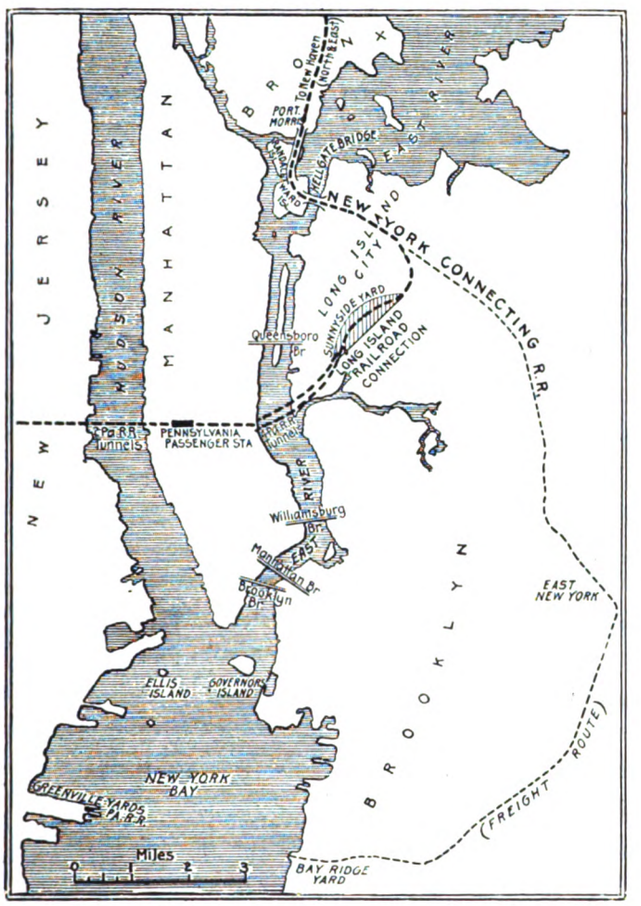
OPENING OF HELL GATE BRIDGE, NEW YORK.

An engineering event of much importance from the standpoint of transportation was the opening to traffic on April 1 of the Hell Gate Bridge, the masterpiece of Dr. Gustav Lindenthal, chief engineer, which forms the final link of the New York Connecting Railroad between the New York, New Haven and Hartford and the Pennsylvania systems.

For years New York City may be considered to have been the dividing point in the railway lines radiating from it in all directions. Both passengers and merchandise arriving in New York from the south or west had to be transferred in order to go east and north. The building of the Pennsylvania Station on Manhattan and the construction of the tunnel under the East River to connect with the Long Island Railroad was the first step in the project to provide through trains and to reduce the ferry distance for the transhipment of freight at New York.

The course of the New York Connecting Railroad is indicated on the map. In the Bronx the line leaves the N.Y., N.H. and H.R.R., spans one after another the Bronx Kill and Little Hell Gate, and



New York Connecting Railway.

crosses Randall's Island. Then, by a sweeping curve through Ward's Island, it turns eastward and passes by the new Hell Gate Bridge to the Long Island side of the East River. The Connecting Railroad then continues through Long Island City, and, turning to the west, joins the Pennsylvania Railroad tracks at the Sunnyside Yard. The passenger trains, drawn by electric locomotives, proceed through the tunnels under the East River and Manhattan Island and the Hudson River *en route* to the West; but goods trains go by a belt line around Brooklyn to Bay Ridge on New York Bay. From this point the cars are taken by ferry to the Pennsylvania Railroad terminal at Greenville on the New Jersey shore.

The bridge and viaduct portions of the line from 142d Street in the Bronx to Sunnyside Yard on Long Island was a difficult part of the construction. Three miles of it consist of steel spans on concrete piers, with one mile on an embankment, retained between high concrete walls held together by tie-rods. Apart from its importance as a traffic route, the Hell Gate Bridge is also a notable engineering construction, as it has the longest and heaviest steel arch in the world. It is remarkable also for its beauty of outline, due to the collaboration between its designer and the architect, Mr. Henry Hornbostel. The following data are from the *Engineering News* (New York):—

Span, 1,016 ft. 10 in., between tower faces; 995 ft. 1⅜ in. between centres of bearings.

Arch, height from centre of end hinges to centre of top chord, 140 ft. at ends, 260 ft. at centre. Height to centre of lower chord, 220 ft. Greatest height above mean high water, 310 ft. Clearance above mean high water, 240 ft.

Towers, height above ground, 240 ft.

Width, 93 ft. between centres of railings; 60 ft. between centres of trusses.

Bottom chord, 6½ ft. wide, 11½ ft. deep at ends, 7½ ft. deep at centre; maximum section, 1,384 sq. in.

Heaviest single piece, 185 tons (shipping weight, 150 tons).

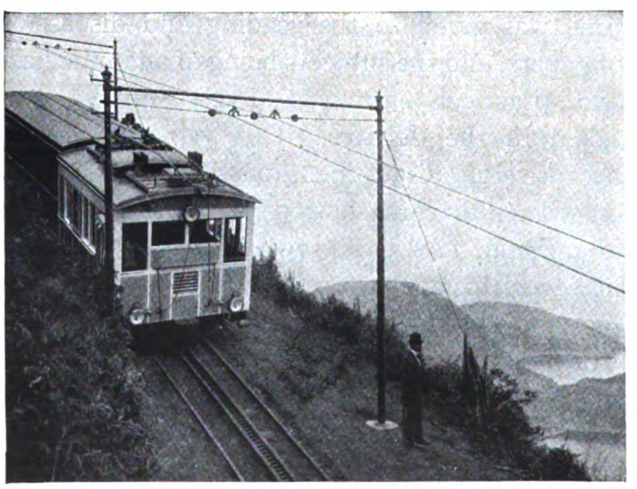
Load, the arch carries four tracks on ballasted concrete floor; total dead load, 52,000 lb. per lin. ft. of bridge.

OERLIKON SPECIALITIES.

The British and Colonial department of the Ateliers de Construction Oerlikon, Oswaldestre House, Norfolk Street, London, W.C., have sent out a handsomely illustrated 64-page booklet containing numerous pictures of the electric and other machinery manufactured by the company. Generators, turbines, motor generators, motors, transformers, switches, relays, and so forth, are shown in great

Single-phase Locomotive with two 1,250-h.p. Motors. 15,000/400 volts.

variety. We reproduce here views of two electric locomotives with motors of Oerlikon make. Manufacturing has not suffered so much from war conditions in Switzerland, where the company's works are situated, as in many other countries, and it is possible to work to relatively reasonable delivery schedules. The importation of raw materials into Switzerland from America and Great Britain is receiving all the attention it merits, and facilities, such as are offered



Three-phase Locomotive with two 155-h.p. Motors. Coreovada Railway, Brazil.

by the Société Suisse de Surveillance Economique, and by the attestations from the Ministries of Munitions of the Governments of nations allied to Great Britain, also the loyal execution of the company's undertakings and guarantees to the Governments involved, make it practical for the Oerlikon Works to maintain their manufacturing processes to a large extent. They are therefore frequently in the position to assist clients in connection with urgent work.

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LONDON, JULY 12, 1917.

The Tramway Congress. Taking present circumstances into account, the ninth annual congress of the Tramways and Light Railways Association, which is reported in full in this issue, must be considered highly successful. The members met again under war conditions, but from the business point of view it was more thorough than last year's gathering. A longer time was given to the reading and discussion of papers, and the subjects being of an immediate and practical nature, a lively interest was taken in the debates. This was the greater because the discussions, particularly the one on women drivers, showed plenty of divergence of opinion. As the proceedings were limited, however, to one afternoon, and as the reading and discussion of the first paper, which was illustrated with numerous lantern slides, photographs and diagrams, took up considerable time, there was less opportunity than desirable for the remaining subjects. Want of time, however, is a common complaint at such conferences, as organisers succumb to the recurring temptation to present numerous good subjects, and debate on the earlier ones sometimes leaves little room for those coming later. The manufacture, life, and maintenance of tramway car tires were dealt with thoroughly in the paper by Mr. Arthur Norton, while the numerous illustrations relating both to manufacture and to wear in use were highly informative. Several tramway managers who spoke from their own experience indicated clearly the difficulties encountered in efforts to minimise wear and tear. Mr. A. V. Mason, in introducing the subject of return fares, suggested among other things a system under which passengers making the longer journeys should be carried a greater distance for each penny of the fare. A notable proposal came from Mr. E. H. Edwardes, who opened a discussion on standardisation of conditions of labour and rates of pay. This was the formation of tramway federations in various areas to deal with such subjects. Some difficulties were pointed out by various members, such as getting all municipal undertakings into the proposed federations and the difference of conditions as to wages and cost of living in different parts of the country. The hope was expressed that the Council of the Association would go into the question. The great success which has attended the employment of women drivers in Greenock was the theme on which Mr. A. Robertson opened a discussion. In Paisley, it appeared later on, the experiment has not been very successful, while in London it cannot be tried owing both to police and trade union objections. On the whole, the members of the Association had good reason to be satisfied with a useful and practical afternoon, and they dined together quietly in the evening without formality and without speeches, but with much social conversation.

Higher Fares in America. The urgent necessity for higher fares which has been particularly felt in connection with tramways in this country during the past two years is also a matter which has assumed the highest importance in relation to the street railways of the United States. The uniform fare of five cents for any distance within town and suburban limits has been the rule away back to the horse-car days. Coupled with it is the right of transfer to another car taking a different route without paying any additional fare. The latter privilege is taken advantage of to such an extent in the large cities that in New York, for example,

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the average fare received per passenger trip is only 3½ cents instead of five. Working expenses have, of course, always been fairly high, as most things are dearer in America than in this country. In recent years these operating costs have steadily been going up, and since the war began they have advanced enormously, owing to increases of wages and of prices for everything. Now that America is in the war matters are likely to become still worse. Meantime they have reached a point where some of the companies declare that the only alternatives to higher fares are bankruptcy or public ownership, in which latter case, of course, the loss would fall on the ratepayers. In May last a definite movement was inaugurated among electric railway companies in the States of New York and Pennsylvania in favour of increased fares, and it is now beginning to spread to other States. In some of the States the companies are not able to raise fares without the consent of the public bodies which govern street railway undertakings, and which have much greater powers of control over them than the Board of Trade has over tramways in this country. These Public Service Commissions indeed have quite autocratic powers within their own sphere of action. Recently the New York Railways Company, the Brooklyn Rapid Transit Company, and the Third Avenue Railway Company made application to the Public Service Commission for the First District of New York—that is for the city as apart from the State—for authority to make a charge of two cents for a transfer. This the companies consider more suitable to the local conditions than raising the ordinary fare to six cents. The hearing of the applications was to begin on June 6, and it may be some little time before decisions are given. In the State of New York, outside the city, the proposal is that fares should be increased to six cents. The Pennsylvania Street Railway Association has a special committee considering the desirability of concerted action on the subject of higher fares. Some public opposition has arisen to the movement, although the companies can show that the continued and unavoidable increase of working expenses is placing them in a perilous financial position. What Public Service Commissions may do it is not safe to prophesy. One remembers, by way of analogy, the scanty concessions made by the Inter-State Commerce Commission to the great steam railways of the Eastern States in the matter of freight rates. The street railway companies must hope for the best.

Coal Supply and Electricity Supply.

Both of these subjects were before the annual meeting of the Municipal Electrical Association on June 21 and 22. Electric power and lighting stations generally feel difficulties in connection with the supply of coal, both as regards quantity and quality. A notable event was a speech by Mr. Guy Calthrop, the Coal Controller, who attended the meeting in order to appeal to central station engineers for assistance in saving coal. In return, members of the Association had many representations to make to Mr. Calthrop as to their troubles in obtaining coal. He invited them to submit full details, so that communications are likely to result which may be of benefit to the central stations, and may also lead to further coal economies. The other matter of importance before the meeting was the great increase in electricity supply owing to the heavy demands for Government work and the related subject of the Government's Electric Power Supply Committee. That again leads on to the demand for a reorganisation of the State control of the industry. As to the Power Supply Committee, the Association have now had three more municipal representatives appointed to that committee, the feeling evidently being that municipal interests were not getting fair play as compared with company-owned undertakings. There appears to be a widespread idea that the Ministry of Munitions refuses municipal undertakings facilities for extending their plant, while granting such facilities to power companies. To a certain extent this fact—if it is a fact—may be explainable on the ground that it is preferable to extend large power stations rather than small and uneconomical ones. More definite information is wanted on the subject, and a frank statement by the Government departments concerned would also be of value. It is certainly to be desired that there should be no friction in connection with the Power Supply Committee, but that all parties should work together.

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THE BRITISH TRADE CORPORATION.

There is much reason for gratification that so large a measure of approval was given by the House of Commons on June 14 to the amended constitution of the British Trade Corporation that the way was cleared for those responsible for this great project to go ahead with their organisation. It may be remembered that when the scheme was before the House a few weeks previously there was a good deal of hostile criticism of details of the charter of incorporation. The opposition arose principally from the point of view that the Corporation might compete with traders, though its avowed object was to help them. At the time we were of opinion that the criticisms were largely factious, but however that may be they lost their point after the issue of an official memorandum on behalf of the proposed bank making certain specific declarations.

The granting of a charter to the Corporation and the main provisions of it were in accordance with the recommendations of a committee appointed by the Government, and presided over by Lord Faringdon, who is now the chairman of the new institution. With an authorised capital of £10,000,000 the Corporation ought to be of great assistance in enabling British manufacturers and traders to finance their overseas developments, and to obtain reliable foreign trade information to an extent which has not hitherto been possible.

Sir Albert Stanley, President of the Board of Trade, mentioned, when the subject again came before the House on June 14, that he had given careful thought to the points raised in the previous debate. The White Paper which had been circulated set out the formal declaration of the Corporation, and made it quite clear what obligations were imposed by the charter. The Corporation, he declared, would not operate as a competing contractor, merchant, or trader. The declaration also made it clear that no special privileges were conferred on the Corporation as regards access to Government information or placing them in any preferential position. He was advised by the Law Officers of the Crown that this declaration was absolutely binding on the Corporation.

Some of Sir Albert's points in regard to the matter call for reproduction. There was, he showed, imperative need for such an institution in this country. Whatever steps were possible should be taken to help those engaged in trade and industry to meet the altered conditions after the war. There was need of an organisation with great financial resources and having associated with it experts in various industries who had a knowledge of what was required to establish a new business on a sound basis. It would have been possible to form a private company for the purpose, but in that case a subsidy would have been necessary in order to get the right business men. The alternative was to follow the recommendations of Lord Faringdon's committee, and that was what had been done. There was no subsidy and no agreement. Lord Faringdon had been very loth to take the responsibility of forming the Corporation, and he was, along with those acting with him, entitled to the thanks of the House.

Most of the criticism which followed was favourable, and Mr. Bonar Law (the Chancellor of the Exchequer) delivered a speech containing some interesting matter. Amongst other things, he said that there should be some means by which young men without the capital of their older competitors should have a chance of getting credit which would enable them to establish new lines of business. When the war was over, what would be needed more than anything, and what would be difficult to get, would be the credit without which trade and industry would become paralysed. For that reason he regarded the proposed bank as a good thing. Another aspect to which he gave prominence was this. When the war came to an end the German banks which had been doing great business in this country would be in a different position. The credit which traders had got from them had gone, and it had to be replaced, and it would be extremely foolish to turn down any effort to place greater credit at the service of our traders and manufacturers. Mr. Bonar Law also insisted that no preference was given to the Corporation over existing institutions. The Government were ready to give the same facilities to any similar body of men who would undertake to do the same kind of work.

On June 27 the British Trade Corporation issued a prospectus inviting subscriptions from the public for 150,000 shares of £10 each at par. The authorised capital is £10,000,000 in £10 shares, and 100,000 shares had already been subscribed. These, with the shares offered by the prospectus, make a total value of £2,500,000, which is evidently the total capital to be issued at present. There are 16 directors, all gentlemen of high standing in the financial and manufacturing world. The following is extracted from the prospectus:—

The Corporation will specially devote its energies to the development of the trade of the British Empire in every part of the world. It will provide financial facilities, the currency of which may extend over a longer period than is covered by the usual advances made by bankers, and it will be prepared to assist in opening up new channels for enterprise where it is demonstrated that financial aid can be afforded without undue commercial risks. The Corporation will further the co-ordination of interests in the case of British commercial and industrial undertakings, as well as afford financial assistance for the enlargement of works and the extension of plant with a view to effecting economies in the cost of production. There exists to-day no large British financial institution possessing an industrial department or an organisation for study and research into new ideas or inventions, which is specially equipped to examine and nurse new schemes or developments until sufficiently proved and ripe for public investment. The Corporation will make this a special feature of its business, and will aim at becoming a link between British industry and the British investor. It will take a lead in the formation of syndicates to deal with business of promise and importance, and it will associate with itself other banking and financial institutions which care to participate in its operations.

The Corporation proposes to appoint representatives in the chief cities of the world who will be domiciled with the bank holding the Corporation's agency. Where similar arrangements are not practicable it is intended to open branch establishments in important centres abroad. The Corporation will establish information bureaux to collect reliable data upon openings for foreign trade, new contracts, State and other loans, and issue proposals. The Corporation will open a credit department for the issue of credits at home and abroad. It is believed that the Corporation will be able to earn from the various directions indicated above a fair dividend from the commencement, and that the pioneer work that it will undertake forthwith will provide an adequate return upon its capital when normal times recur. The charter of incorporation is for a period of sixty years, when, as the prospectus naively says, a renewal will have to be applied for.

COAL GAS ON BATH OMNIBUSES.

Mr. W. E. Hardy, general manager of the Bath Tramways Company and their omnibuses, regards the introduction of coal gas for omnibus working as purely a war-time expedient to meet the difficulty of the petrol scarcity. Experiments have shown that considerable economy is obtained under the present conditions. The gas is at present used on the omnibuses running on the Frome to Midsomer Norton route, where the vehicles have to travel eleven and a half miles over very hilly routes, including the steepest to be found in that part of Somerset. On Midford Hill there is a gradient of 1 in 8. The gas-holders, which are placed on the top of the omnibuses, cost from £30 to £40 apiece, and the exact extent of the economy cannot be determined until it is seen how long these holders will last. Some time is required to refill the gas-holder, which is done with a junction at the ordinary main. If the gas runs out on the journey, petrol is ready to be used, the change being made by the driver turning on a tap at his seat. Mr. Hardy states that it is not at present possible to get the same standard of power from the engine by the use of gas as is obtained with petrol. By the use of gas the company have reduced their petrol consumption by 68 per cent.

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Tramways and Light Railways Association

Ninth Annual Congress, held in London, June 29, 1917.

The annual general meeting and congress of the Tramways and Light Railways Association was held on Friday, June 29, 1917, at the Institution of Civil Engineers, Great George Street, London, S.W. The chairman of the Council, the Hon. Arthur Stanley, M.P., presided.

The Secretary, Mr. A. de Turckheim, having read the notice convening the meeting and the auditor's certificate, the chairman moved the adoption of the report and accounts.

The Hon. Arthur Stanley's Address.

The Chairman.—Once again, owing to the war, we have decided to curtail our annual congress to a one-day meeting, and I think you will agree with the decision of our Council that under the circumstances it is best to do without the usual functions and entertainments and to confine ourselves to the business side of the congress. We appreciate under what a strain you are all working and how difficult it must be for you to leave your work even for a short time. But we felt that it would be a pity to forego this one opportunity during the year to meet together and to discuss the many problems with which you are faced owing to the abnormal times in which we are living. I extend to you a hearty greeting, including those of you who are not members of our Association, whom we welcome here to-day to take part in our deliberations and discussions. I think you will also like me to say a word with regard to those many members of the tramway industry, both among the officials and staffs, who are away on active service. I am glad to think that as an industry we have not been backward in doing our share—far from it—and to all those who are away we send a message of encouragement and goodwill coupled with our sincere good wishes for their safe return.

I will now say a few words with regard to our accounts. The revenue from subscriptions amounted to some £730, as against £775 last year, a falling off of some £45, due of course to the fact that more men have been called away, and we are not asking them to contribute to our funds during the war. The expenses amounted to £647, as against £635, a slight increase of some £12. Adding £25 for interest on deposit and War Loan, and after writing off £13 13s. on subscriptions account, we show a net excess revenue over expenditure for the year of £91, which, added to the balance brought forward from previous years, gives us a total balance of £521 14s. 6d. to carry forward. During the year we added another £200 to our previous investment of £300 in Government War Loan, making a total of £500 and leaving us with no liabilities.

We have again to record the death during the year of two of our vice-presidents, Sir George White, of Bristol, who so loyally supported our association for so many years, and Mr. Hall Blyth, whom you all remember as our generous and excellent host at our congress at Edinburgh in 1911. Although not a member of our association, I should like to refer to the loss sustained by the many friends of Alderman Brodie, of Blackpool, who you will also remember so greatly contributed to the success of our congress at Blackpool in 1913. I am sure you will join with me in expressing our sincerest condolences with their relations.

Coming back to the affairs of the association, I may say that this has been a very strenuous year, and we are glad to think that the association has been of some little value and benefit to its members. It is also gratifying to note that the many Government departments have made full use of the association as a medium for dealing with its members. Among the many matters which have occupied us during the year, I might mention the following:—

Leaving Certificates. It took some little time to obtain it, but we finally got the Order we asked for from the Ministry of Munitions. It was a case of "better late than never"; now, however, as you all know, leaving certificates have been abolished. Then as to—

Substitution, a special department of the War Office took up this matter with us, and although the results may have been somewhat disappointing, on the whole it was well worth the trouble, and a good number of our former employees were returned to us. It is to be hoped that the arrangement may develop further. With regard to—

Supply of Materials, this is perhaps the most difficult of our subjects. You all need materials for repair and maintenance, and you very naturally consider that your case should have priority over all the others; but in view of the shortage due to war conditions there is not enough to go round, and there must inevitably be delays and disappointments. We must hope that the great pressure of the present may soon be relieved and that the Government departments may be in a position to allow us increased rations. In order to relieve this strain, the Government assisted us by holding up materials ready for shipment abroad and offering us the chance of utilising them. I am glad to say that in several cases substantial relief was given in this way. In another way the Government were able to help by granting certificates for importing from America. It was obvious if we could not get home supplies and our tramways were to be kept running, we must be allowed to import from our Allies, and this is now being done satisfactorily, if somewhat more leisurely than we might wish, owing to the fact that different departments are dealing with the matter and that delays are thus incurred. We have also been able to assist each other, and the weekly (I am afraid it was sometimes only monthly) lists of materials issued by the association to its members have led to mutually satisfactory results. (Applause.)

One of our committees was occupied for over a year, together with four other associations, in negotiations with the Inland Revenue Authorities in order to obtain a standard rate of depreciation allowances for motor omnibuses, and I am glad to say that the arrangement come to was accepted as a fair one by all our members.

With regard to general matters, I may add that other committees of the association are busy at the present time considering the question of disabled sailors and soldiers, increase of fares, national insurance (munition workers), and national service (substitution), and we are grateful to those of our members who are giving up much of their valuable time to these matters. The Board of Trade has appointed a Departmental Committee on the Supply of Electricity, and it may be that we shall again be asked to send a representative to give evidence on our behalf. Mr. Sellon, who gave such valuable evidence last year before a somewhat similar committee, will doubtless again come to our assistance should the necessity arise.

The question of women drivers is causing, I understand, a good deal of heartburning, and since we are to hear more about it this afternoon, I will not do more than refer to it and express a hope that no life-long friendships will be shattered in the discussion of this topic. In view of the new list of certified occupations which, by raising the age limit of some of your men, will deprive you of their services, the women driver question is one which must occupy your most serious attention, notwithstanding the many difficulties entailed thereby.

These are, I think, the chief subjects of our labours, though there are a good many minor ones which it would take too long to enumerate. The conditions vary almost from day to day, and I am afraid you have to put up with many difficulties and annoyances, but I do think that in view of all the circumstances it is quite extraordinary how you have been able to maintain and improve your services in the face of all difficulties. The very greatest credit is due to you all, and I heartily congratulate you on the splendid work you are doing. What the society has done shows that we were right some years ago when we decided that it should continue and should not be allowed to die. (Applause.)

Now I shall propose the first resolution, viz.: "That the accounts and balance sheet for the year ended December 31, 1916, be approved and passed," but before I put it to the meeting, if there are any questions, perhaps you would like to ask them.

Mr. Harry England formally seconded the motion, which was carried unanimously.

The Chairman.—Before submitting the next resolution for the election of seven new members of the Council in place of those retiring under the articles, I wish to express our sincere thanks to those retiring members, and first and foremost to Mr. England, who has been our vice-chairman during the last five years and who has so ably and untiringly served the association during these difficult times. Mr. England is one of those lucky men who have no enemies and hosts of friends, and we shall all miss him and his genial presence among us. As chairman I am particularly grateful to him for taking my place when other business prevented my attendance. Mr. Howley, whose name is on the leaving list, is

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recommended for election as vice-chairman, so that we shall not be losing him, and I am sure he will make an able successor to Mr. England. The other members whom we are to lose are Messrs. Mallins and Greene, two municipal members from Lancashire and Cheshire, and Messrs. Mason and White, two company managers, and last of all Mr. Bland, the representative of the manufacturing side of our business, who may be described as one of the tramway veterans. I wish particularly to thank Mr. Bland for the help he has given us as chairman of our Rail Committee and for the hard work he has put in on your behalf, with such excellent results. The Council recommend to you for election the following seven members: Mr. R. J. Howley, vice-chairman; Mr. A. Good, director of Cammell Laird and Company, to take the place of Mr. Bland as representing the manufacturers; Mr. G. W. Holford, of Salford; Mr. W. E. Hardy, of Bath; and three old friends, Mr. C. G. Tegetmeier, Mr. T. B. Goodyer, Croydon, and Mr. W. Thom, Potteries. I move their election.

This was formally seconded and agreed to unanimously.

Mr. H. R. Hogg moved that Mr. A. W. Chambers, the retiring hon. auditor, be reappointed to that office, and that the thanks of the association be conveyed to him for his past services.

Mr. W. T. Robson seconded and the motion was adopted.

Mr. Howley.—Before we part I think that we ought to accord Mr. Stanley a hearty vote of thanks for leaving the great work he is doing at the Red Cross in order to preside here to-day. We know the serious calls on his time. I am sure what he has told us will encourage us to go forward next year and complete the various matters in hand and marked for settlement. I take this opportunity of thanking you for electing me as your vice-chairman. I shall do all I can to help the association, but of course what I can do can be of little use unless I get the help of members generally and especially of the Council. But I know from past experience that I can rely upon the Council. I also look forward to a very large amount of assistance from the late vice-chairman, Mr. Harry England, who has such a wide knowledge of the business and a perfect grasp of its details and intracacies. I have very much pleasure in proposing a hearty vote of thanks to our chairman, Mr. Stanley. (Applause.)

The Chairman having briefly acknowledged the compliment, the proceedings of the ordinary general meeting concluded and were followed by the

NINTH ANNUAL CONGRESS.

The Rt. Hon. Viscount Chilston, president of the association, occupied the chair.

The President, in opening the proceedings, said:—I wish to extend to you all a hearty welcome. I can assure you that I think it is very remarkable that at a time of stress such as we find ourselves in to-day so many gentlemen from all over England who are interested in our work should meet here on this occasion. We all know how difficult has been your work during the past year. The loss of staff which you have sustained during the progress of the war, the difficulty of obtaining labour, the necessity which has arisen of completely reorganising your forces, might all well have been causes to keep you away to-day. All those who are engaged in work such as we carry on have been surrounded with difficulties. Not only have you had the labour difficulty, but you have also had the difficulty of obtaining material. You have had that difficulty not only for new construction—where new construction has been attempted—but also for ordinary repair of the roads. The difficulties of the war have shown, I think, how necessary tramways have been and are for carrying on the traffic of the country. In many of our great industrial centres where munition workers have to be carried, I think it would have been almost impossible to get these people to and from their residences and the factories in many cases had not our tramways existed, and all those who have been engaged in war work, whether professionally or voluntarily, have realised the great assistance which tramways have given to them. I have not come here really to open the congress or to lead it; I intended to sneak in and learn a little bit of your business here, for I felt that hitherto my position in the association has been a very easy one and a very pleasant one. I wish I could have had more opportunities of seeing the more serious side of the work of the association. But, now, having welcomed you to this congress, I do not mean to detain you further, but to listen as an amateur to the remarks of men who thoroughly know the subject on which they are engaged. I therefore call on Mr. Norton to open the first discussion.

THE MANUFACTURE, LIFE AND MAINTENANCE OF TRAMWAY CAR TIRES.

By Arthur Norton, A.M. Inst.C.E., A.M.I.Mech.E.

Processes Employed in Making Steel.

Tires may be made by either the Bessemer or Siemens-acid processes from selected hematite pig-iron, carefully mixed with suitable scrap. The process of conversion into steel having been duly completed, the charge is then tapped from the furnace, or poured from the Bessemer converter into a ladle, preparatory to its being cast into ingots.

Ingots and Ingot Casting.

For the production of tram tires, or any other steel manufacture, it is, of course, of vital importance that the steel ingot, the raw material which we commence upon, should be of the very best. No less than two admirable papers have recently been read before the Iron and Steel Institute by Messrs. A. W. and H. Brearley, and a further two by Mr. J. N. Kilby, on this most important subject of ingots and ingot casting. One therefore cannot do better than recommend these papers to your perusal, containing, as they do, a full description of what is generally recognised as the best and latest practice.

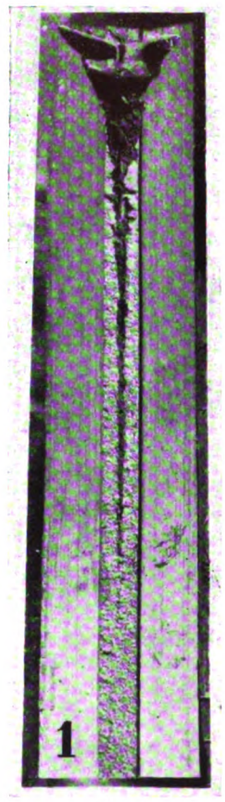

Fig. 1.

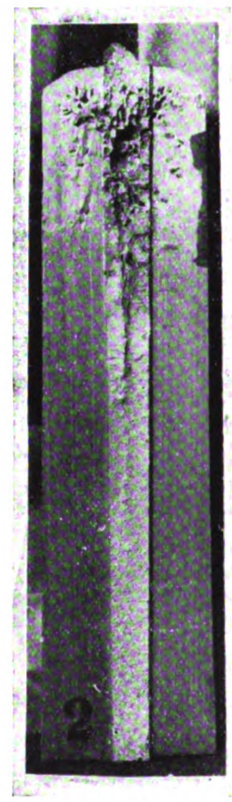

Fig. 2. Defective Ingots.

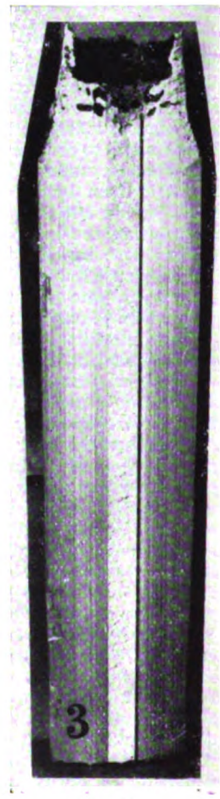

Fig. 3. Sound Ingot.

The accompanying illustrations, Figs. 1 and 2, show defective ingots, being piped down the centre, whilst Fig. 3 is perfectly sound throughout its length. The author therefore starts off on the manufacture of tram tires with what the American would no doubt describe as "some" ingot.

The ingot, having been suitably re-heated, is forged under the press and cut off into square lumps, of a suitable size and weight, from which the tires are ultimately made. These lumps are forged under the hammer, first of all by knocking the four corners down into an octagon form, subsequently flattened to the shape technically known as a "cheese." A hole is then punched in the centre, and further forging of the solid ring is proceeded with, until the desired size necessary for the roughing mill, or becking hammer, is obtained. These rings, having been re-heated to a nice working heat, are now shaped into the form of the tire, either on a powerful roughing mill or given the desired form under the becking hammer. The roughly-formed tire is further re-heated, and finished to the desired dimensions on the tire mill.

Marking and Pairing of Tires.

Upon completion of the rolling process the tire is stamped whilst hot with the maker's name, year of manufacture, and cast number, care being taken to stamp the tires as near as possible to the inside diameter, so that the marks shall not be obliterated by wear. In this connection it is of very great importance that all sharp notches,

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whether in the form of letters or markings, be carefully avoided, and marks should not be stamped deeper than is absolutely necessary.

In rolling a large quantity of tires there will always be found a certain amount of tolerance in the outside diameters, so before proceeding with the machining of the tires it is as well to pair them as far as is possible. In numbers of cases the tires are put into service without being turned on the tread and flange, but in those cases where they are turned unnecessary machining is saved by this little attention.

Gauges and Gauging.

The accurate gauging of the bore of the tire is of extreme importance, as it is very essential that the standard shrinking allowance of 1/1,000th of the diameter of the wheel centre shall not be either above or below the limit fixed. It is a moot point whether sufficient importance is attached to this question, as also to the use of a really suitable material for the manufacture of gauges; for it may be pointed out that the surface points of both the inside and outside diameter gauges being so small, a certain amount of wear is inevitable, which can be easily added to by the rough usage to which such gauges may be subjected in the hands of rough and careless workmen. Some such special steel as "Quickstep," with hardened and tempered points, would suit admirably for this purpose.

It is also of great importance to have the master gauges kept in safe custody, so that the gauges used in the shops may be proved from time to time. Unless this precaution is adopted, the contraction allowance, on the inside diameter gauge, may very readily be exceeded, with the resulting consequences of broken spokes in the wheel centres, or even the actual bursting of the tire. This is especially liable to occur in those cases where more than the standard allowance for contraction has been allowed.

There are records where as much as $\frac{1}{8}$ in. allowance has been made in tires for contracting on to centres (with straight spokes), having a diameter round about 26 inches, to which allowance may be added a possible further amount due to the worn state of the gauges, as indicated above.

The allowance for contraction in a tire would no doubt have to be increased when wheel centres are designed in such a way that the rims are not in alignment with their bosses, wheels designed in this way being provided with "S" spokes, and the contraction of the wheel centre will therefore vary according to the greater or less degree of the curvature of the spokes.

Apparatus for Recording Expansion and Temperatures.

An apparatus has been designed for correctly recording the exact amount of expansion and contraction that takes place at the varying temperatures upon heating and cooling a tire. By means of this recording apparatus, as applied on a $2\frac{3}{4}$-in. standard section tram tire of the following dimensions:—

31 in. outside diameter,
25-23/32 in. inside diameter,

the expansion and contraction that took place were most carefully recorded, and are set out in the form of a curve, shown in Fig. 4.

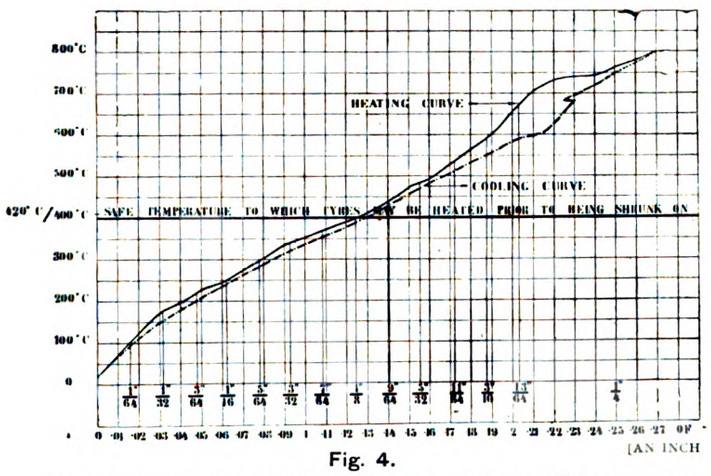

Fig. 4.

Heating and Cooling Curve, showing actual expansion obtained at different temperatures on a 31-in. driving tire, inside diameter, 25 23/32 in.

Heating and Cooling Curve.

It may be useful to tabulate the expansion and corresponding temperatures that were recorded, which were as follows:—

Expansion.	Temperature.
3/64 in.	220° C.
1/16 in.	250° C.
1/8 in.	400° C.
5/32 in. full.	500° C.
3/16 in.	600° C.

It is frequently remarked that tires are put on at a "black heat," but it may be instructive to point out that, given a good light, a "black heat" may carry a temperature of 550° C. to 600° C., although if the shop be badly lighted this latter temperature would be a visible red.

A temperature of 650° C. would show a visible red in a well-lit shop, but in the case of tires that have been subjected to careful heat treatment the whole effect of that operation may be nullified by exceeding the safe temperature of 400° C.-420° C. mentioned below, and indicated on the diagram. Also at 650° C. one is getting dangerously near the calescence change point, when the condition of the steel is completely changed owing to the diffusion in the

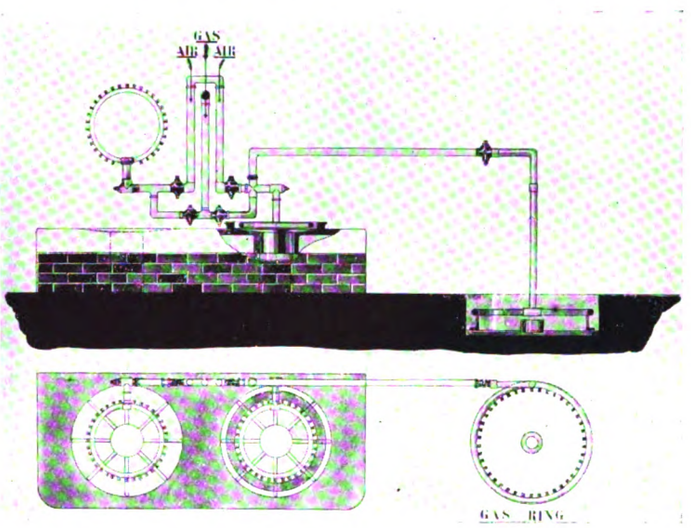

Fig. 5.

Belfast City Tramways Arrangement for Shrinking on Tires.

pearlite areas, and at such temperatures quenching would have the effect of partly hardening the tire. This calescence change point is shown in the heating curve round about 740° C., and in the cooling curve at 680° C. Should the calescence change point be exceeded, and the tires cooled off by the ordinary hose-pipe method, the tires will develop hard and soft places, with the result that flats are very much more readily induced when the tire comes to be put into service.

Having fixed the necessary contraction, and knowing the required temperature that is necessary to contract the tire on to its wheel centre, it is of importance to see that the temperature so fixed upon is not exceeded, and it may be emphasised that it is undesirable to go beyond the safe limit of 420° C., this being the melting temperature of zinc, and can therefore be very readily checked, as described below.

Method of Heating Tires Prior to Shrinking on to Centres.

The tires, having been bored to the correct diameter on the tire-boring mill, are then heated on a gas ring arrangement, a very good form of which is shown in Fig. 5, which shows the actual fixing of a gas ring into a tire prior to heating. This apparatus was designed by Mr. Blackburn, of Belfast.

This arrangement allows the tire to be heated to the exact temperature required, the latter being readily checked by placing one or two small pieces of zinc on the face of the tire, the zinc being suitably covered with a metal cup, so as to retain the heat, the cup being removed momentarily in order to see if fusion has taken place.

As pointed out, it is not necessary to heat the tire to this temperature, as 1-16 in. expansion takes place at 250° C., and the tire can be very readily gauged when heated. Care should be taken to see that the desired expansion consequent on the temperature is not exceeded.

We now come to the point when the wheel centres already pressed on to the axle are carefully turned to the required diameter, the method thus adopted ensuring the wheels being concentric with the axle.

Fig. 6 shows a method designed by the Sheffield Corporation Tramways for lifting the wheels and axle into position over the heated tire, the actual lifting being accomplished by very quick acting block tackle. The wheel centre is then lowered into the tire, and the general practice adopted for cooling off the tire is the rather primitive one of applying a stream of water by means of a hose-pipe, administered by hand.

Even Temperature During Cooling.

As every precaution is taken in the process of manufacture to keep the temperature of the tires uniform, it may be pointed out that this method is liable to produce unequal distribution of cooling stresses. A better method is to allow the tires to cool off slowly

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in the atmosphere, but this is not always possible, owing to the time that is required for such an operation. It is therefore advisable to instal a perforated ring, and through the perforations provided water is allowed to play freely on to the surface of the tread of the tire. This perforated ring is shown in position in Fig. 6, the volume of water applied being controlled by means of a hand-cock, so that the rate of cooling can be controlled at will.

Removing Worn-out Tire.

Fig. 5 also illustrates the method adopted in Belfast for removing a worn-out tire. The pair of wheels are placed in such a position

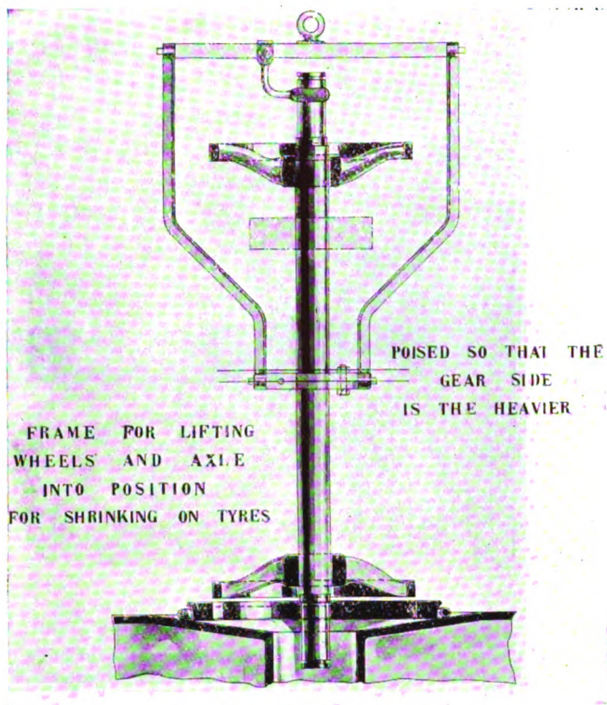

Fig. 6.

Method designed by Sheffield Corporation Tramways for lifting wheels and axle into position over the heated tires.

that the gas plays freely on the tread of the tire, the time required for the operation, from the time it is placed inside the gas-ring, being seven minutes.

Fixing Wheel Centres to Tire by Means of Studs.

The practice of fixing the tire to the wheel centre by means of studs was formerly in more or less general use, but on such big

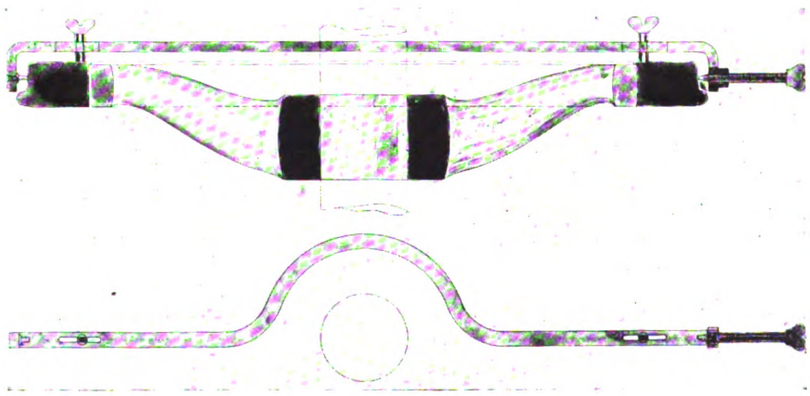

Fig. 8.

Outside Diameter Gauge.

systems as Glasgow it has been discarded altogether as being unnecessary. There is grave objection to boring holes in tires, necessitated by the above practice, as each of the holes forms a notch in the body of the tire, from which fractures may readily start, and especially in those cases where the tire is nearing the end of its life.

Fig. 7 shows a general view of the Belfast wheel shop, and in the left-centre is shown Mr. Blackburn's radial arm drilling machine for drilling and tapping the stud-holes described above, the machine being actuated by one man. (The Tramway and Railway World, February 12, 1914.)

Flats on Tires.

One great advantage of the adoption of the steel-tired wheel over the cast-iron chilled wheel has been the comparative freedom from flats, which so readily obtained in the latter, especially when the chilled portion had worn away; but no doubt the opportunities of producing them at the present time may be more frequent, owing to the type of labour available for drivers being possibly not quite so skilled, as in the days preceding the attempt of the German Emperor to rule the earth.

Care of Tires During Life.

It is of vital importance that the question of wear should be very carefully observed and recorded, so that anything in the way of

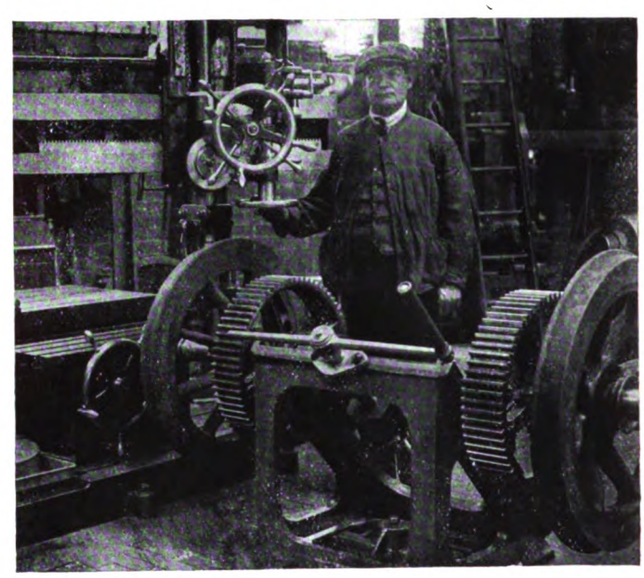

Fig. 7.

Radial Arm Drilling Machine in use at Belfast.

abnormal wear to tread or flange may be corrected before it has gone too far, or, what may be of still greater importance, the cause of such deterioration may be detected and corrected accordingly. An apt illustration of this came under the author's notice some years ago, when investigating the wear of certain tires that had been the cause of complaint. The cars under which these tires were running were of the bogie type, and it only required a very cursory glance at the wheels as they stood under the car in the running-shed, to see the primary cause of the trouble. This may be briefly explained by stating that the cars, having negotiated a curve, the bogies had been unable to get back into alignment, owing to the very badly-worn state of the bogie centres, the centre having eaten into the bolster to the extent of ½ in., which in turn had caused the guides to seize, the trouble being further accentuated by the entire absence of lubricating matter. Now had these cars been properly overhauled the tires would never have got into such an abnormal condition, as the cause for such wear, revealed as it was by a most cursory examination, should have been at once removed.

Maintenance of Flanges.

In considering the question of tire wear it is always important to remember that the wheel flanges play a very significant part in steering the car through the various points, crossings, and curves, and it therefore becomes a matter of vital importance to see that the flanges are properly maintained so as to avoid any risk of derailment, with more or less serious consequences. In addition, the amount of side-play is reduced—an important consideration when one takes into account the increased wear to both tire and rail, which is bound to take place when too much lateral movement is allowed.

It is therefore advisable to send the wheels into the shops for re-turning at that point in their lives, when the flanges can be re-formed with the least possible loss of metal on the tread, and for further guidance it may be useful to quote the practice adopted in Belfast, which may be summarised when any of the following conditions obtain :—

(1) When the tires on one pair of wheels have worn to different diameters.

(2) When the inside of the flange becomes approximately at right angles to the tread, thus forming a definite corner on the tire.

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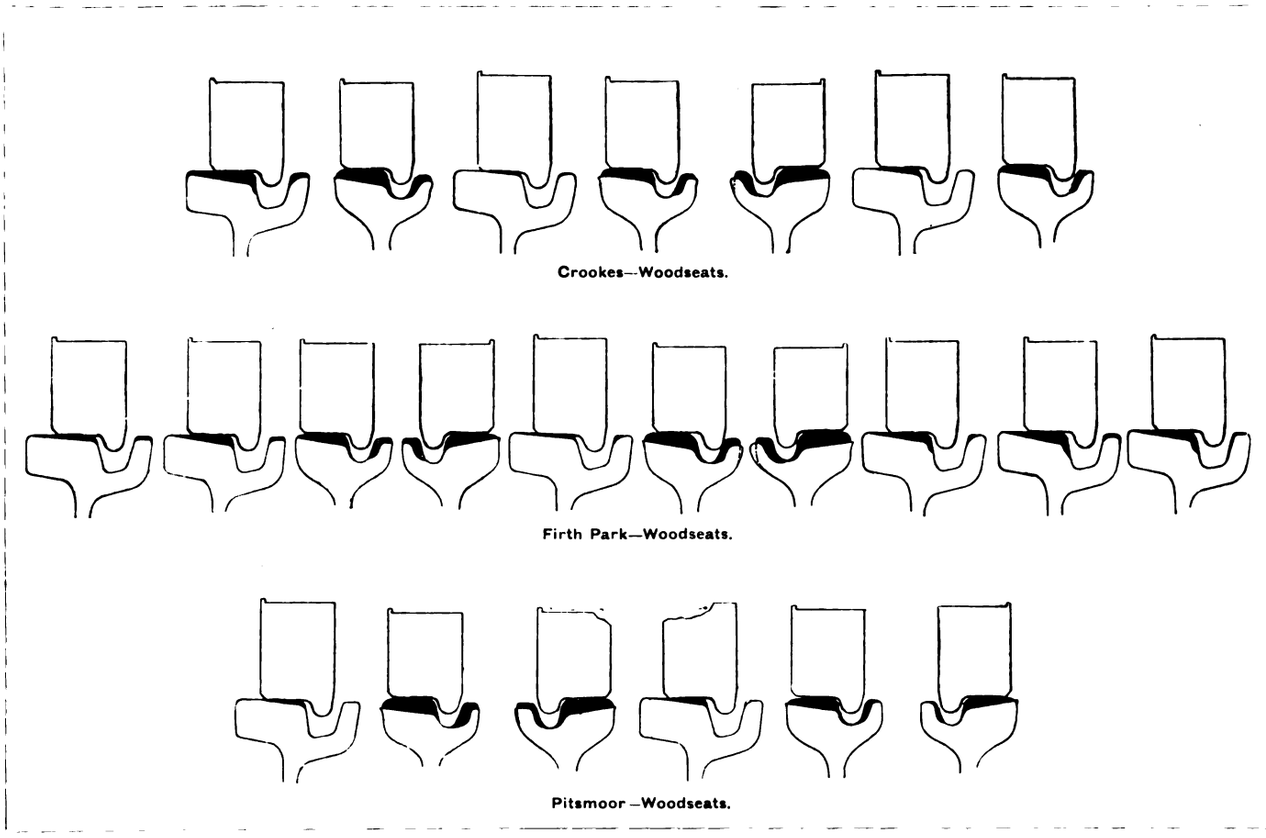

Fig. 9.
Track Wear—Sheffield Corporation Tramways.

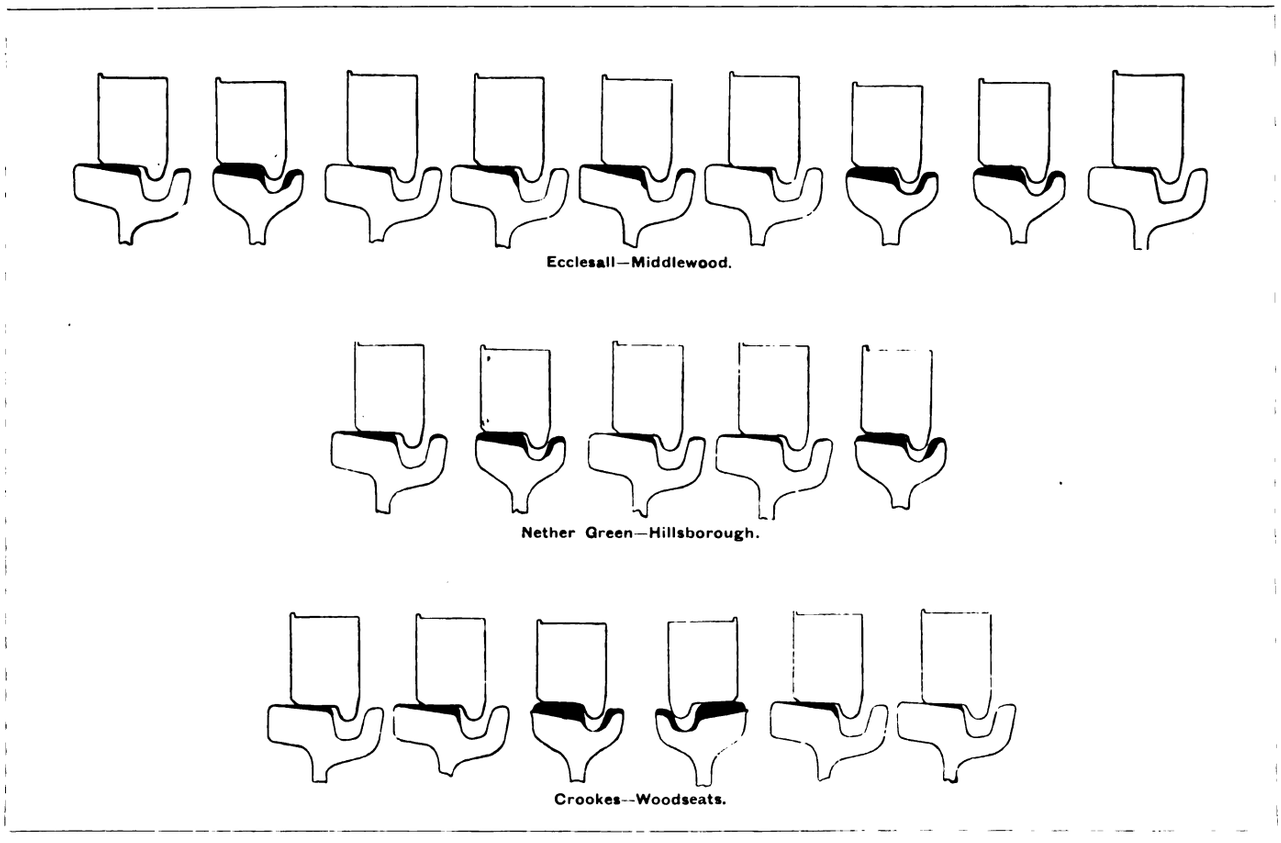

Fig. 10.
Track Wear—Sheffield Corporation Tramways.

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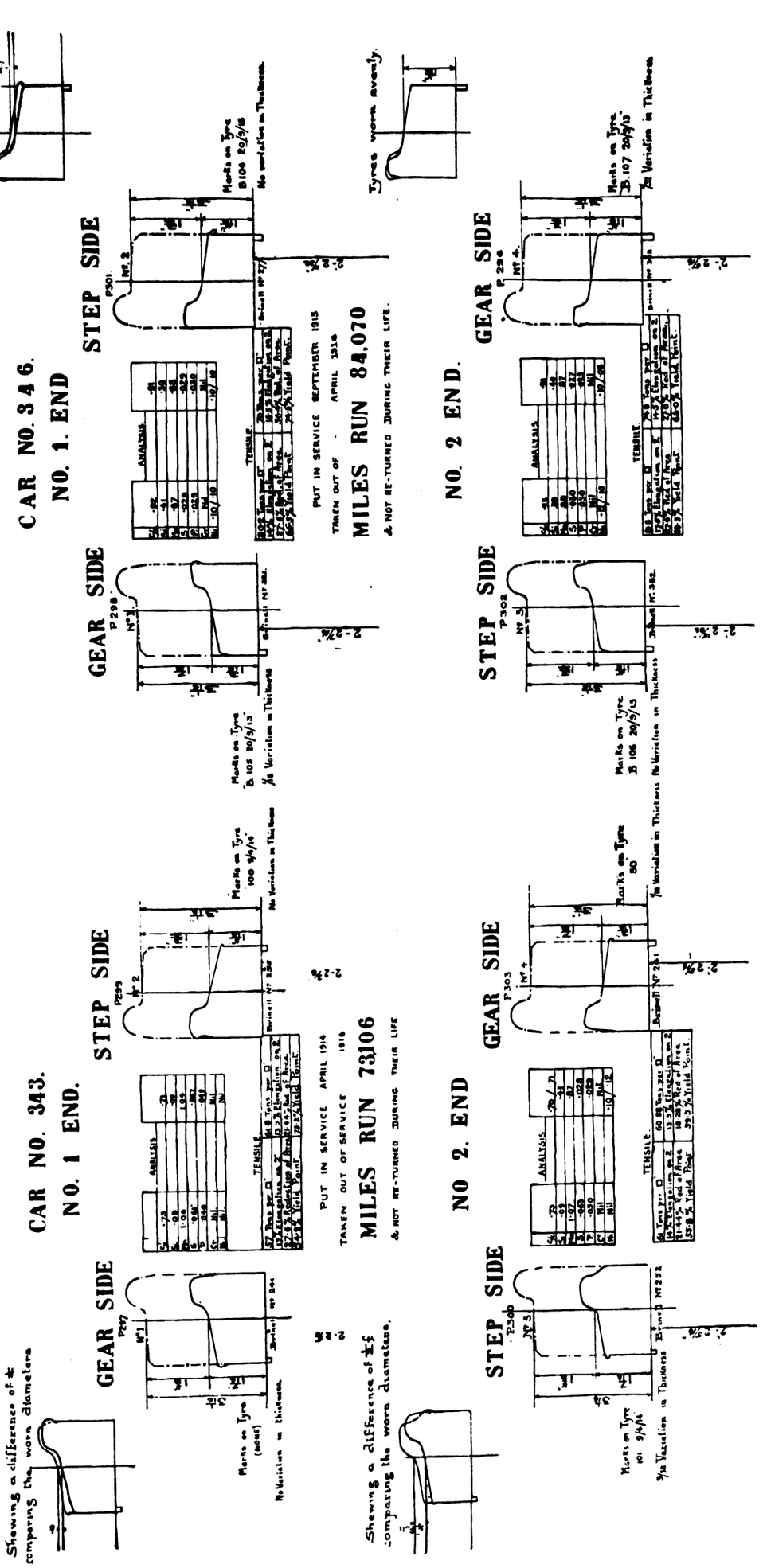

Fig. 11.

Sheffield Corporation Tramways—Tires run completely out without re-turning.

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(3) When the flange becomes more than 3-16th in. above or below the standard section of flange of the original tire.
(4) When the flange at its base is less than ⅞ in.
(5) When the tread of the tire is worn with a considerable hollow.

In re-turning worn tires, it is not the general practice to re-form the profile to its original contour, as it is argued if this were done it would necessitate cutting too much valuable material away, which in turn would shorten the life of the tire.

It should be borne in mind, however, that the ratio of wear increases as the width of the flange decreases, but this point will be referred to again later.

Outside Diameter Gauge.

For gauging the diameters of tires the gauge points should always be fixed at a certain distance from the outer face of the tire, as shown in Fig. 8. By this method absolute continuity in recording the wear of tires is obtained, as it is from the point thus obtained on the section that the profile of the worn tire is drawn, and the life due to wear recorded.

In certain cases, when calculating the mileage result, the amount of material cut away to re-form the flanges and to pair the tires is included with that which has been lost owing to wear. This method cannot altogether be described as satisfactory, as the actual loss due to wear should only be considered in arriving at the mileage results.

In this connection it may be well to emphasise the fact that when the diameter of one wheel is found to be wearing smaller than the other, it is better that such difference should be corrected as soon as possible, the flanges being re-formed to their original section at the same operation. When tackled in time the amount of material that is necessary to cut away from the body of the tire to re-form the profile is so very much less than would be the case when one wheel was, say, half an inch smaller in diameter than the other, and it is always well to bear in mind the adverse effect that such a pair of wheels must have on the track, etc.

Reasons for Excessive Tire Wear.

Owing to a variety of causes the mileage results obtained on some systems are greatly superior to those obtained on others. Some of the conditions may be pointed out which have a decided adverse effect on tire wear :—

(1) Systems which operate in very hilly districts.
(2) Systems which operate in narrow streets, and where very sharp curves obtain.
(3) Narrow-gauge tracks.
(4) Single tracks with loops.
(5) Worn condition of tracks, and with special reference to the present time, the impossibility of effecting repairs to such tracks until after the war.
(6) Maintenance of car frames.
(7) Motors running against each other.

With reference to the condition of tracks, Figs. 9 and 10, prepared from information kindly supplied by Mr. Fearnley show a fair average of the actual wear that has taken place on the various routes indicated, the profiles being taken in July, 1916. It may be of interest to point out that the original section of the new tire when put into service had an inclination of 1 in 20, but after it had been in service some ten weeks the incline had become 1 in 6 !

Lubrication of Rails where Sharp Curves Occur.

On certain systems in dry weather lubrication of the rails on sharp curves is effected by a liberal spraying of water, which should effect a considerable saving in flange wear, as the mud which is formed makes an effective lubricant.

Differential Axle.

In Huddersfield a differential axle has been adopted for the purpose of preventing rail corrugation with very satisfactory results. In this connection, however, a report was issued by Mr. Wilkinson (The Tramway and Railway World, May, 1916), in which it was stated that the wear of tires had in no way been decreased, but as the trials had not been completed when the report was issued, the ultimate result should prove interesting, as one would naturally expect a longer life, especially as regards the flanges, with tires running under such conditions.

Turning Cars.

It is also of importance to see that cars are turned frequently, so that they shall not always be running on the same rails.

Maintenance of Car Frames.

The maintenance of the car frames, with special reference to the squaring of them, together with the wear of the axle-box guides, has a very considerable bearing on the question of tire wear, as owing to the flexibility of a car frame, and the difficulties of really efficient staying, the frames are very liable to get out of square, and are often helped in this direction by the too sudden application of the track brake.

The immediate result of this defect is to cause both excessive and uneven wear in the flanges and diameters of the tires, which latter eventually causes the tires to slip.

Tires Run Through Their Life without Re-turning.

Fig. 11 shows two sets of car tires that have been run completely out without re-turning during their life. [The author here exhibited eight sections of tires.]

The mileage obtained from these two sets was 73,106 in the first case and 84,070 in the other, or, taking the worst-worn tire in each set, you get 4,873 miles per ⅛ in. wear in the first case and 5,604 in the second. It may also be noted that in the case of Car No. 343, No. 2 end, there is a difference of ½ in. in the diameter of one wheel as compared with the other, the result being that the smaller wheel has to travel 1½ in. further than the large one at each revolution.

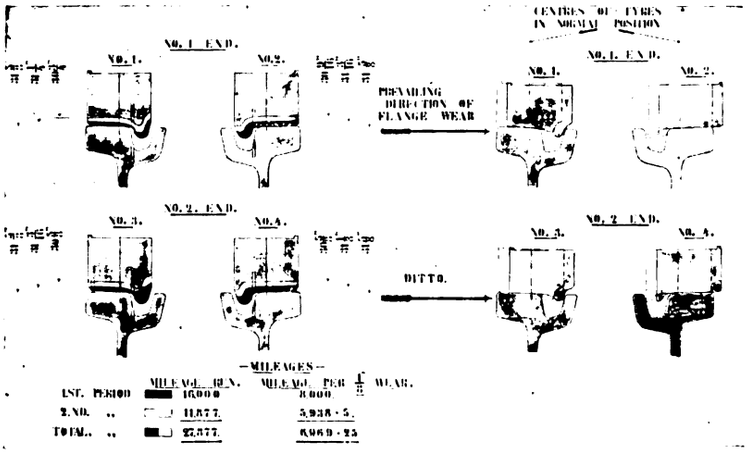

Fig. 12.

Glasgow Corporation Tramways Tire Wear—Car on Uddington and Paisley Route.

The difference has to be made up by continual slipping, thus causing excessive wear to both tire and rail, excessive consumption of current, to say nothing of our very old and esteemed friend, "rail corrugation." It therefore follows that the ratio of wear of the smaller tire is increased as its diameter decreases, with the added consequence of flange creeping, which again emphasises the importance of re-turning and pairing the tires more frequently during their life.

Two rather interesting examples of tire wear are shown in Figs. 12 and 13, which were taken from actual profiles of tires in service at Glasgow and Sheffield. It will be noted that in both cases the flanges of the tires have worn in the same direction, i.e., have crept towards the centre of the tire on one side of the car, whilst the flanges have followed on the other side of the car. This peculiarity of wear is in contra-distinction to that which obtains on flanges when the car frame is out of square, as the wear is then shown crosswise.

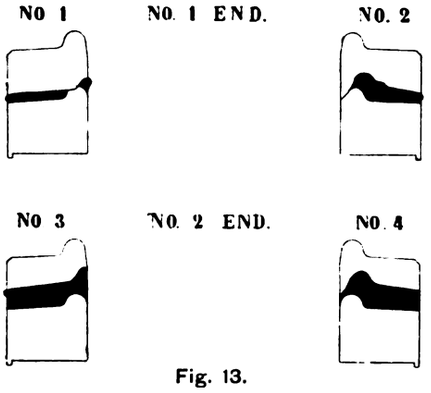

Fig. 13.

Sheffield Corporation Tramways Tire Wear—No. 2 end tires reduced 1¼ in. diameter so as to pair with No. 1 end tires on a mileage equivalent of 25,000.

When the tires shown in Fig. 12 are in normal position the worn diameter of No. 2 tire is 3-16th in. smaller than the worn diameter of No. 1 tire.

When No. 2 tire is hard up against the check of the rail the difference between the diameter of this tire as compared with No. 1 tire is still further accentuated, as No. 1 tire is forced over beyond its normal centre, and is consequently running on an increasing diameter, the throat of the flange being worn away as shown facilitates the travel of the tire sideways, until checked by No. 2 flange coming into contact with the check of its rail.

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It may be stated that the sections of the rails shown are the full original sections as rolled, so that if the worn rails are substituted, as shown in Fig. 14, a great deal more lateral movement actually takes place than is indicated on the diagram. When therefore the pair of wheels have got over to their extreme limit, i.e., when the flange of No. 2 tire has got hard up against the check of its rail, the relative positions of the wheels to the rail are liable to be frequently corrected, owing to the slipping that is taking place in the smaller wheel. Consequently every time this happens a sudden shock is inflicted on the outer face of No. 1 flange, coming, as it does, into violent conflict with the check of its rail, thus causing abnormal wear to the outside of its flange, with a corresponding increase of wear to the inside of No. 2 flange.

With reference to mileages obtained, it may be stated that the records of these tires are being very carefully noted, and for the first period run a mileage of 8,000 miles per $\frac{1}{8}$ in. radial wear was obtained, whereas for the second period an approximate wear of 6,000 miles per $\frac{1}{8}$ in. is shown, or a reduction of 25 per cent., due, no doubt, to the reduced width of the worn flanges, for, owing to the extreme shortage of labour, owing to war conditions, it was found impossible to turn the tires after the first period.

In Fig. 13 a set of Sheffield tires is shown having the same peculiarity as regards wear as illustrated in Fig. 12. In addition it may

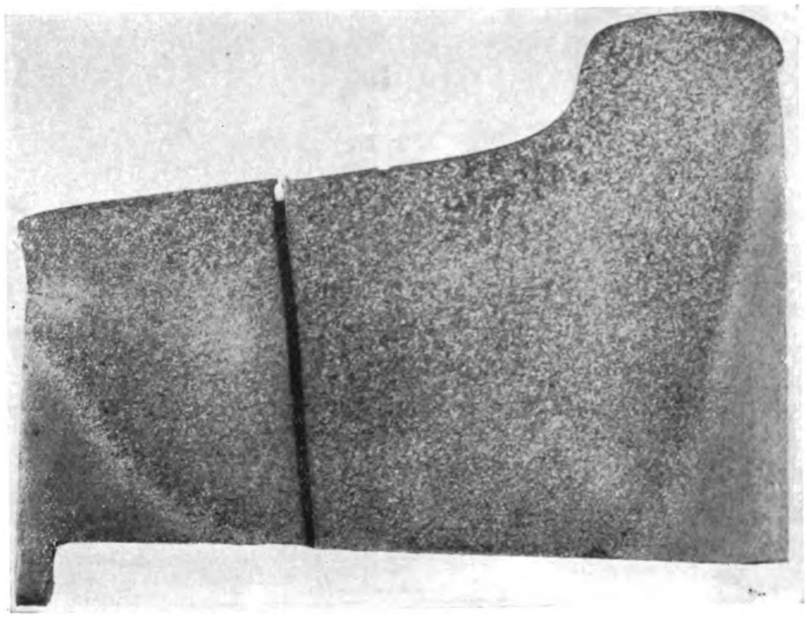

Fig. 15.

Sheffield Corporation Car Tire—Effect of application of water while tire is being rolled.

be pointed out that the tires of No. 1 end show a good deal more wear than those of No. 2 end, due possibly to the motors working against each other, and in this connection it would be rather interesting to know if any means have been adopted for synchronising the motors.

Unless the motors are working in unison the turning of all the four wheels to the same diameter appears, on the face of it, to be unnecessary. These tires were turned up to the new profiles shown, and in order that the wheels of No. 2 end should equal the diameters of No. 1 end, it meant a reduction of $1\frac{1}{4}$ in. in the diameter, or a loss of mileage equivalent to 25,000 miles.

Double Drive.

Mr. Blackburn some few years ago introduced a double drive at Belfast (i.e., driving from both ends of the axle), with very satisfactory results. (The Tramway and Railway World, April 7, 1910.)

This considerably reduced tire wear on both tread and flanges, producing infinitely more even wear in both respects.

It would be of interest to hear the experience of others who may have adopted a similar arrangement.

Limit of Wear.

The life of a tire is generally concluded when its thickness is reduced to $\frac{3}{4}$ in. or $\frac{7}{8}$ in., although there are cases on record where that limit is exceeded, e.g., a pony tire was run until it had practically worn through, the thickness being about $\frac{1}{8}$ in. to 3-16th in.; and a driving tire down to 7-16th in.; but the flanges in both cases were wonderfully well maintained.

Effect Produced by Application of Water Whilst the Tire is being Rolled.

A microsection of No. 4 tire, gear side, of Sheffield Corporation car No. 343 (Fig. 11), shows the alteration to the structure of the material that has taken place, owing to the action of the water applied to the tire whilst being rolled on the tire-mill. This application is necessary for the purpose of removing scale, and giving a perfectly smooth surface to the finished tire.

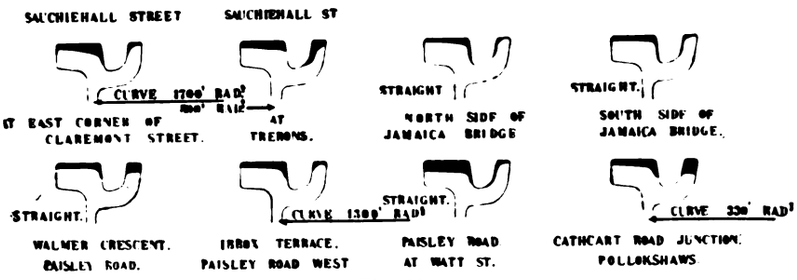

Fig. 14.

Glasgow Corporation Tramways Sections showing wear on rails.

The two outer faces at each corner show the material immediately abutting those faces to be considerably refined, and the clear lines of demarcation shown in the structure take the distinct form of an ellipse. If the remaining two-thirds of the tire could have been examined the same formation would have been found, the reason being that the material cools off more rapidly at the corners, owing to the bigger area offered, than the centre of the tire, which retains its heat, and is consequently not affected by the action of the water.

The material is therefore much tougher on the outer faces, but had the tire been correctly treated the refined formation shown at the corners would have been obtained throughout, resulting in a uniform degree of structure and toughness.

The firm with which the author has the honour of being connected have carried out a considerable number of tests on tramway tires, rolled to the standard section, some of which were untreated, whilst others were subjected to a regular form of heat-treatment.

Falling Weight Test.

The results of the falling weight tests obtained are set out in Fig. 16. The falling weight test, as specified by the London County Council, was adopted for the purposes of the test. This called for a weight of 1 ton, falling freely on the tire, placed in a running position, from a height of four feet, increasing by one foot at a time, until the required deflection of $1\frac{3}{8}$ in. (in the case of driving tires) was reached.

The analysis showed a carbon content of ·75, manganese 1·25, and silicon ·22. In Series 1 the heat-treated tires received the uniform average of nine blows, fracturing at the tenth in each case. Eighty-two foot-tons were expended on each tire, and the average deflection obtained was six inches. Regarding the untreated tires, an average of only 2·5 blows

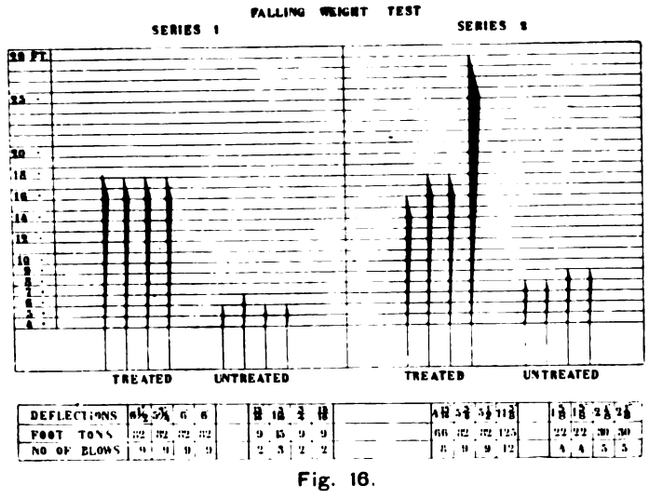

Fig. 16.

Results of Falling Weight Test.

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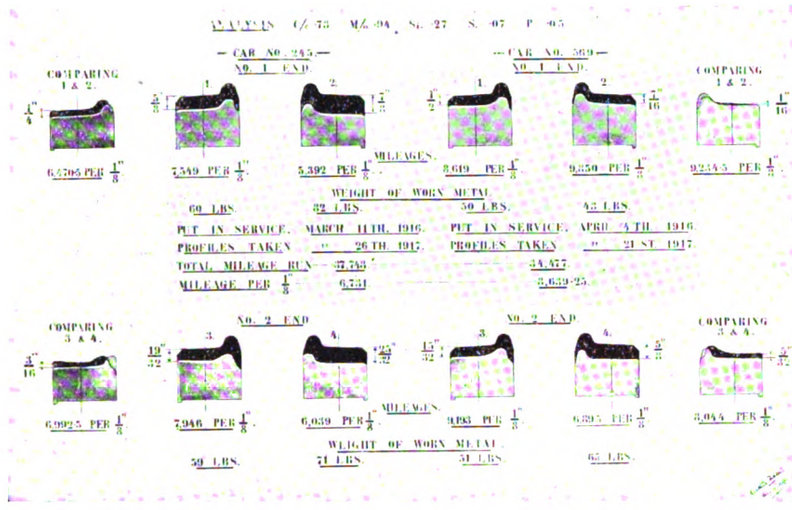

Fig. 17.

Glasgow Corporation Tramways (Uddingston and Paisley Route).—Running results of heat-treated tires.

was obtained, with 10·5 foot-tons, and an average deflection of just over $\frac{7}{8}$ in.

The average tensile tests are set out below :—

	Maximum Stress.	Elongation on 2″×·564	Yield Point Ratio %	Reduction of Area.
4 treated tires ...	60·2 tons ...	17·8% ...	69·4% ...	33·8%
4 untreated tires	61·15 ,, ...	6·6% ...	62·9% ...	7·1%

In Series 2 the treated tires received an average of 9·5 blows, with 88·75 foot-tons, and yielded a deflection of $6\frac{3}{4}$ in., whilst the untreated tires received an average of 4·5 blows, with an expenditure of 26 foot-tons, and an average deflection of $1\frac{7}{8}$ in.

TENSILE RESULTS.

Tires	Maximum Stress	Elongation on 2″×·564	Yield Point Ratio %	Reduction of Area.
4 treated	60·2 tons	17·8%	69·3%	31·7%
4 untreated	61·7 ,,	6·2%	57·6%	6·2%

TENSILE RESULTS.

It may be noted that, whilst the tonnage is slightly reduced in the case of the treated tires, the factor of safety is greatly increased by the improved elongation, yield point, and reduction of area obtained, in addition to which the wearing quality of the steel is greatly improved by the uniform and very much finer structure obtained.

LIMIT OF HARDNESS.

The degree of hardness in car tires is limited by the question of rail adhesion, which, in view of braking in hilly districts, is of vital importance. Fig. 17 shows the amount of wear that has taken place in two sets of car tires put into service at Glasgow. These tires were made of steel of an ordinary analysis, being afterwards subjected to careful heat-treatment.

The accompanying illustration, Fig. 18, shows the tires after being subjected to the following weight test, and are numbered 1, 2, and 3.

The London County Council test before described was adopted, with the following results :—

FALLING WEIGHT TEST.

	Number of blows without fracturing.	Deflection.	Foot tons.	Remarks.
No. 1 ...	10 ...	$4\frac{5}{16}$″ ...	86 ...	Broke at 11th blow from height of 20 ft.
No. 2 ...	14 ...	$8\frac{3}{8}$″ ...	165 ...	Broke at 15th blow, the last two blows being delivered from a height of 30 ft.
No. 3 ...	16 ...	$10\frac{1}{8}$″ ...	193 ...	Unbroken, the last two blows being delivered from a height of 30 ft.

TENSILE TESTS.

	Maximum Stress.	Yield Point Ratio %	Elongation on 2″×·564.	Reduction of Area.
No. 1 ...	68·8 tons ...	66·2% ...	15% ...	27·6%
No. 2 ...	62·8 ,, ...	69·4% ...	15·5% ...	27·6%
No. 3 ...	65·2 ,, ...	69·3% ...	16·5% ...	33·5%

The actual running results of these tires are exceedingly instructive, for whilst the mileages obtained per $\frac{1}{8}$ in. radial wear, viz., 6,731 in one case and 8,639 in the other, may be considered eminently satisfactory, under present conditions of running, the great disparity of wear shown issues big rations of food for thought!

In comparing the four pairs of tires it will be noted there is a difference of $\frac{1}{2}$ in., $\frac{3}{8}$ in., $\frac{1}{8}$ in., and 5-16th in. between the diameter of one wheel as compared with its fellow on the same axle, showing the greater disparity that exists the greater the wear, for while the average mileage obtained for the tires on No. 1 end of car No. 569 was 9,234·5 miles per $\frac{1}{8}$ in. radial wear, only 6,470·5 miles was obtained in respect of the tires on No. 1 end of car 245, whilst the difference in loss of weight of material is 49 lb., and it may be noted that both these sets of tires are in service on the same route.

Does not this fact again emphasise the great importance of more frequent turning of tires (that is, of course, when normal times come round again), when the diameters are found to be unequal, with the consequent reduction of the width of the flanges, when tires are run in that condition ?

The grinding away of one tire by the other not only affects the question of the tires themselves, but also has a considerable bearing on the question of current consumption, wear to rails, including rail corrugation.

Referring to this latter, Mr. Stephen Sellon, in his excellent paper on " Rail Corrugation and Its Causes," read before the Institution of Civil Engineers in 1914 (Minutes of Proceedings, Vol. cxcvii.), referred to an estimate made by the Chief Officer of the City of

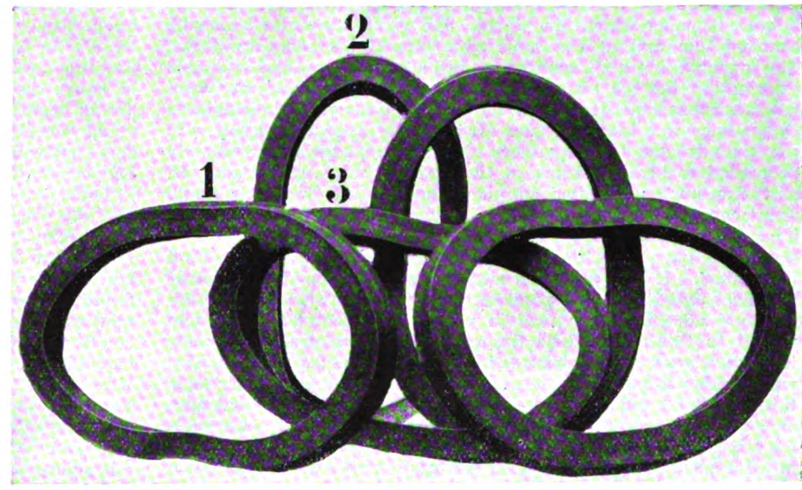

Fig. 18.

The Glasgow tires after being subjected to the falling weight test.

Glasgow Tramways that rail corrugation cost that undertaking at least £10,000 per annum, and other systems have no doubt heavy charges in the same direction.

There can be little doubt that the maintenance of the tire sections, flanges, and diameters should receive more frequent attention during

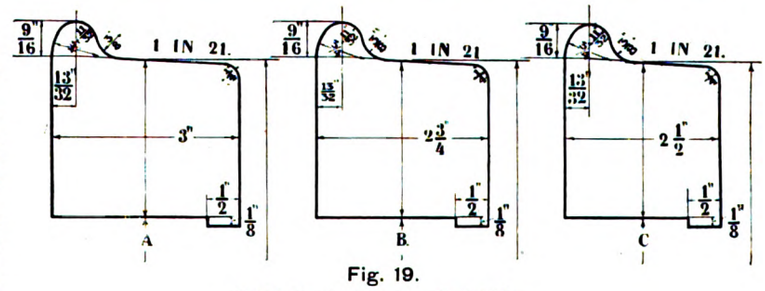

Fig. 19.

British Standard Sections—Rolled Sizes.

their life than at present appears to be the case, and this paper will not have been written in vain if by having drawn attention to this matter the practice is more generally insisted upon.

Admitting it may be necessary to cut away a little more material from the tread to re-form the flanges, with the consequent charges

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for labour, loss of material, etc., the other side of the account would be more than balanced by the reduction of rail wear, current consumption, and a helping hand to our old friend, "rail corrugation."

In 1915 a special committee of this association was appointed to consider the question of securing an adequate supply of tram tires in the difficult times we are living in, and, with this end in view, a meeting was arranged with the tire manufacturers. It was at once suggested that if the sections shown in Fig. 19 could be generally adopted it would greatly facilitate matters.

Our esteemed secretary, Mr. de Turckheim, who never lets the grass grow under his feet, at once got on the war path by circularising members, with very satisfactory results. Three different widths, viz., 3 in., 2¾ in., and 2½ in., were adopted, and it is pleasing to record that the standard section has been generally adopted, but if there are any managers who have not yet seen their way to adopt it, it can only be hoped they will give the matter their urgent consideration.

The question of standardisation as regards the wheel centres is, unfortunately, a more difficult one, owing to the fact that one has to deal with what is already actually existing, but with regard to new work the consideration of this most important question should not be lost sight of, as it would enable manufacturers to roll for stock, when immediate necessities could be supplied at once.

In conclusion, the author has very great pleasure in recording his gratitude to the following gentlemen for so readily granting information in connection with the preparation of the paper:—Mr. Fearnley, of Sheffield; Mr. Ferguson, of Glasgow; Mr. Blackburn, of Belfast, who also kindly supplied some of the slides; and last, but not least, his brilliant colleague, Mr. Harry Brearley, whose untiring research work in unfolding the very complex problems which are ever arising in the production of steel has made his name famous, not only in "Steelopolis," but also in the great steel world beyond.

DISCUSSION.

Mr. A. Good (Sheffield) said he hoped that, being a tire maker, he would not be considered prejudiced in opening the debate upon the admirable paper which Mr. Norton had given them, for which he thanked him and at the same time offered his congratulations. The paper contained some most estimable advice and valuable information for the tramway managers and engineers, who were hard task masters. If allowed, he would also say that in his opinion that advice was long overdue. If anything appeared wrong with the tires it was his experience that the managers immediately proceeded to heave a brick at the maker's head—poor man. If, as the author had pointed out, one tire of a pair of wheels would wear more rapidly than the other, they were unequal in hardness; if a flat appeared there was a soft patch; if perchance one should burst, then they were condemned as a rotten lot. (Laughter). If that paper led members of the association seriously to reflect that it was just possible the crime might lie nearer home, it would not have been read in vain. For example, they might be led to think that their frames were not in true alignment; that there were such things as inefficient drivers; and also that it was possible to put the tires on too lightly. There were many small things which might produce the sad results. He hoped managers would be led by the paper to reflect on these lines. As one whose duty it was to endeavour to provide the best possible material he did not propose to criticise the paper; it was really above criticism. But there were one or two points to which he would like to draw attention. Mr. Norton had dealt with the subject of gauges and gauging and said, "It is very essential that the standard shrinkage allowance of 1/1,000th of the diameter of the wheel centre shall not be either above or below the limit fixed." It certainly should not be above one thousandth part of the diameter, that was, say, a 26-in. centre would give about $\frac{3}{32}$ in. That was ample. The smaller the nip they could put on their tires the better. One other point Mr. Norton made was as to cooling down, and he hoped the author would excuse him for saying that in his opinion he did not press the point sufficiently. Cooling down tires with water was a primitive method, and it was a dangerous method, especially if they were using the hard tires which were now being supplied by the best Sheffield makers. Cooling such tires down rapidly was certainly a very great danger to the tires, and it had an important effect on the hardness. Whatever might be their theories as to calescence, a tire cooled down in that way was a positive danger. He hoped that all those members of the association who had sprayers would go home and put them on the scrap heap. The few extra moments required to allow a tire to cool on to the centre under atmospheric conditions were negligible, and they would by that method save both money, time, and vexation.

Mr. H. Mozley (general manager, Burnley Corporation Tramways) submitted the following notes on tires:—The old railway rule for shrinkage was 1/64th in. for each foot of diameter, which is rather more than 1/1000th. We have had no trouble with our tires during the last 30 years. We had a lot of cast-steel wheels with curved spokes which fractured round the boss, but we did not attribute it to excessive shrinkage of tires. The method of heating tires is similar to ours, as also is the method of removing old tires. Our tires are not studded in. We discarded studding as being useless as a preventive in cases of loose tires; nor do we use a lip with the tire; they are simply bored straight through, the nip due to shrinkage being quite sufficient. In ordinary "pre-war" maintenance we ran a set of wheels an average mileage of 36,000 miles and then the car is due for general overhaul, when the wheels are turned up true and to equal diameters and they are then run to death, that is, till worn out, generally another 34,000 to 36,000 miles.

As to varying diameters, we do not find great differences in the two pairs of driving wheels on any one car. Generally speaking the two wheels on one axle will come out very closely of equal diameter, and the difference between the two ends of the car is not very great. A few examples are herewith given taken from our records as a general sample of our experience:—

No. 1 end axle. Wheel diameter = 30 $\frac{8}{16}$ in. and 30 $\frac{1}{2}$ in.
No. 2 end axle. Wheel diameter = 30 $\frac{7}{16}$ in. and 30 $\frac{1}{16}$ in.
Mileage = 35,773. New diameter = 32 in.
No. 1 end axle. Wheel diameter = 30 $\frac{7}{16}$ in. and 30 $\frac{3}{8}$ in.
No. 2 end axle. Wheel diameter = 30 $\frac{1}{4}$ in. and 30 $\frac{1}{4}$ in.
Mileage = 35,469. New diameter = 32 in.
No. 1 end axle. Wheel diameter = 30 $\frac{5}{16}$ in. and 30 $\frac{1}{4}$ in.
No. 2 end axle. Wheel diameter = 30 $\frac{3}{16}$ in. and 30 $\frac{1}{4}$ in.
Mileage = 40,126. New diameter = 32 in.
No. 1 end axle. Wheel diameter = 28 $\frac{5}{8}$ in. and 28 $\frac{1}{2}$ in.
No. 2 end axle. Wheel diameter = 28 $\frac{3}{8}$ in. and 28 $\frac{1}{8}$ in.
Mileage = 37,947. Turned-up tires diameter = 30 $\frac{7}{16}$ in.
No. 1 end axle. Wheel diameter = 29 in. and 28 $\frac{7}{8}$ in.
No. 2 end axle. Wheel diameter = 28 $\frac{7}{8}$ in. and 29 in.
Mileage = 35,033. Turned-up tires diameter = 30 $\frac{1}{2}$ in.
No. 1 end axle. Wheel diameter = 28 $\frac{3}{4}$ in. and 28 $\frac{5}{8}$ in.
No. 2 end axle. Wheel diameter = 28 $\frac{1}{2}$ in. and 28 $\frac{1}{2}$ in.
Mileage = 50,018. Turned-up tires diameter = 31 $\frac{1}{8}$ in.
No. 1 end axle. Wheel diameter = 29 $\frac{5}{8}$ in. and 29 $\frac{7}{8}$ in.
No. 2 end axle. Wheel diameter = 29 $\frac{11}{16}$ in. and 29 $\frac{3}{4}$ in.
Miles run = 69,895, wheels not turned up during total run. Diameter when new = 32 in.

Our tires are 2½ in. thick on the tread and we wear them down to about ¾ in. to $\frac{7}{8}$ in. thick, when they generally show signs of coming loose. As to "tire wear," we have taken careful profile records covering a number of years to determine if there was any uniformity in flange creeping; but we met with nothing uniform. Our cars are all bogie cars, and we had at one time eight cars with Brill 27 G equal wheel trucks and four-motor equipments. These always come out with badly-shaped wheel flanges; they were sometimes so bad as almost to cut away the flange altogether.

The only four-wheel truck which we have is under the locomotive, and the wheels under this always come out perfect in form. The truck is, of course, very rigid and cannot spring. The wheel base is 5 ft. 6 in., weight 12 tons. We used the Brill maximum traction truck under our double-deck cars until about six years ago, and found flange creeping varied very much and seemed to have no relation to squareness of trucks or to the contour of road, all other conditions being equal in our case. Our profile record shows examples of all kinds of "creeping," but with no rule or system either with regard to wheel diameters or anything else. We now use our standard Burnley maximum traction truck on all types of cars, and although we have not entirely got rid of the trouble, the improvement is most marked, and very many sets of wheels come out almost as good in shape as they went in. We attribute this to the peculiar design of this truck. The driving wheels carry something like 90 per cent. of the total weight of the car, and the truck centre is directly over the centre of the driving wheel (not between the axles as is usual in bogie trucks). The pony wheels have little to do beyond steering the truck. This arrangement causes the driving wheels to place themselves as near truly radial to the curve as any device yet tried. The trucks are wonderfully easy under the car, and curves have no binding effect at all. If anyone is present from Birmingham, it would be interesting to hear their experience with this type of truck as to flange and tire wear generally.

Differential gear is mentioned. I think we may claim to be the first tramway to try differential gear, for as far back as 1907 we had a car fitted with it. Our experience was bad. Flanges of wheels wore out directly, and the life of the tires was short and merry, only 6,273 miles being got out of them. They had to be turned up after 2,569 miles run. We found that slipping was very much more common with this gear, as each wheel was independent, and if either sander failed to act the car could not start on heavy grades in greasy weather. The gear was used in connection with a radial bogie and was found to be of no benefit whatever.

We have noticed that if a season happens to be a very wet one, our tire wear is greater than during the dry periods. With regard to pony wheel tires, we get very long life owing to the light load on them. We also run them until they are practically worn away, say ¼ in. to ⅜ in. thick on the tread; the mileages will average about 100,000 to 110,000 miles.

We have a rather peculiar problem, however, which has so far not been solved. Occasionally a flat will develop on a pony tire which cannot be caused by skidding the wheels, as the brakes are so proportioned that the weight applied to them can never be sufficient to do this because the driving wheels will be skidded long before them. The flat is always on one wheel only, and further,

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this wheel is always smaller than its mate at the other end of the axle. There is no uniformity as to position under the car; that is, it may be on either side or at either end of the car, and on any route and under single or double-deck cars. Nor does it occur systematically under the same car or truck or on the same tire. They develop very rapidly, perhaps two days will suffice to make one a troublesome nuisance. Sometimes there will be two flats and on several occasions there have been a series of them so as to make the wheel corrugated all round, but in every instance the mate wheel has been perfectly free from the least suspicion of a flat. Nothing of this kind has been experienced with driving wheel tires. Why one wheel should wear quicker than its mate during one period of its life and not afterwards is a mystery. The trucks are all carefully tested for squareness on each overhaul. They are all very rigid and all carefully machined both for axle boxes and also where the cross-bars fit. The wheel base is 4 ft. in all cases; gauge 4 ft. The same fault was as bad with the old Brill maximum traction truck as with the truck we now use. It is not a question of "drive," as these wheels simply "roll." Its appearance is erratic; sometimes we have none for a year, then we shall have one or two cases, then at another period we shall have half a dozen cases simultaneously.

Our tires are all made to the same specification (both driving and pony). The specification is:—

Carbon	·69
Silicon	·34 to ·40
Sulphur	·04
Phosphorus	·04
Manganese	·70 to ·80
Nickel	·23

Tensile test, 54 tons.

As to synchronising the motor, I cannot see how this can be adopted with success in tramway working. Armatures fail and are replaced by others. The same applies to field coils. These changes are constantly being made, and the different parts are constantly being mixed up, especially in a large system, which has to keep a heavy service going with a minimum of spare cars.

Mr. W. Worby Beaumont (London) said the first speaker had referred to the experiments described in the paper on heating and expansion. These had first directed his own attention to it. Perhaps the measurements on the heated tires were made under some difficulty and inconvenience owing to the high temperature to which the observer had been subjected. He had made a few calculations based on the figures given, so as to compare the expansion at different ranges of temperature. Assuming a normal 62 deg., he obtained a co-efficient of dilation which at 200 deg. C. gave 0·00000458 per deg. Fahr. That co-efficient was lower than found by any other investigators. The same might be said of the co-efficients deducible for the whole range of temperatures up to 600 deg. The co-efficients of lineal expansion, according to the author's results, were as follows per degree Fahrenheit:—

Expansion.	Temperature.	Co-efficient of Expansion.
$\frac{3}{64}$ in. ...	220 C. ...	0·00000458
$\frac{1}{10}$ in. ...	250 C. ...	0·00000522
$\frac{1}{8}$ in. ...	400 C. ...	0·00000635
$\frac{5}{32}$ in. full ...	500 C. ...	0·00000623
$\frac{11}{16}$ in. ...	600 C. ...	0·00000629

These figures show clearly the discrepancies in the temperatures or the measurements. For example, in the first two measurements, with a difference of 30 C., a dimension is given which is far too large. This is shown by the next pair, where there is a difference of 150 C., the expansion is only increased as 1 to 1·7 with a temperature range of 1 to 5. It is also to be noted that the expansion, according to the figures, decreases with the rise in temperature of 200 C. Either the smaller measurements given were wrong or the temperatures were wrong.

Coming to another part of the paper, he was encouraged to think that flats on the square wheels one sometimes heard on tramlines bore some relation to tires that had been allowed to wear so much that there was a difference of as much as ½ in. between the wheels running on one axle. Now it might be difficult to get work done in war time, but if wheels with half an inch difference in diameter on one axle were in common use, they ought not to be surprised if they got a great deal of grinding of the rails and flats on the wheels. That difference meant that the wheels had to skid a mile out of every 57 miles run.

Finally, Mr. Worby Beaumont asked with reference to the "differential axle" what the author meant by "satisfactory results"? He had said they had been adopted with satisfactory results for the purpose of preventing rail corrugation. What experience had the author which supported this? From the many diagrams exhibited that evening it was clear that there was plenty of work for men when the war was over, both on the permanent way and in placing wheels at proper distances apart from their axles, so that the treads did not run on the checks and the flanges on the treads, as appeared from what had been shown on the screen.

Mr. A. R. Fearnley (general manager, Sheffield Corporation Tramways), adding his thanks to those of the other speakers for the useful paper, pointed out that it should be recognised that Mr. Norton had approached the matter from the point of view of the manufacturer who was anxious to assist the users in obtaining the best possible results from the material supplied to them. They would all appreciate his efforts in that direction, and welcome the suggestions as to the best way of arriving at improvements in their methods of working. The diagrams exhibited on the screen proved that there were at least two tramways in the country which were not afraid to show the worst results they obtained instead of (as was generally done) making public only the best results. At the same time the diagrams suggested to those acquainted with the details of the particular systems that every care should be taken before a standard section of rail was decided upon. A good deal of the trouble so clearly shown up on the screen was, referring to Sheffield tires, due to a poor section of rail which was put down 17 years ago, a large quantity of which unfortunately was still in use, and compelled the adoption of the narrow tire with $1\frac{11}{16}$-in. tread.

In regard to the paragraph on pairing of tires, there was considerable difference of opinion amongst rolling stock engineers on this question, but the tendency to-day seemed to be in favour of turning up all tires before putting them into service, it being found that as rolled they were not sufficiently true or round to warrant them being paired in the way referred to in the paper. With respect to the gauges, he entirely agreed with Mr. Norton's views, and feared it was true that these gauges at times received rough usage. As to the removing of worn-out tires, heating in a gas-ring was not necessary; a couple of machine saws placed in proper position enabled the wheels and axle to be rolled under the saws, and old tires removed in a few minutes without the use of gas.

The most important part of the paper was that relating to the maintenance of the flanges. The points made by Mr. Norton were very important, and one could easily see which had a considerable amount of side-play without going far afield on any of our systems. The trouble in that direction was almost universal. The best method of dealing with it, however, was difficult to arrive at; as Mr. Good had said, they insisted upon their pound of flesh, or our 5,000 miles per ⅛-in. thickness. If they turned tires down to maintain even wheels and good flanges, they reduced the total mileage very seriously. Mr. Mozley had stated that four-wheeled cars were all wrong, and that bogie cars were all right, yet his final results in tire mileage were exactly the same as those shown on the screen. Mr. Norton had given a number of reasons for excessive tire wear, but there must be another reason which he had not yet found out. The mileage results of tires on cars working in similar districts and under very similar conditions varied as much as 20 per cent., and they had not yet been able to find a satisfactory reason for this. With regard to hard tires, they had already tried some of them, but up to the present had not succeeded in obtaining commensurate results.

Mr. W. E. Ireland (London County Council Tramways) said that he could confirm the author's views as to the desirability and advantage of pairing tires and mentioned that in the L.C.C. shops this had been the practice for several years. He did not, however, approve of the practice of putting tires into service unmachined on the treads, owing to the fact that only a very small percentage of tires have the rolls truly circular. With regard to the matter of heating tires for shrinking, he again agreed very fully with the remarks of the author, and mentioned that as a result of experiment and experience in the L.C.C. shops, the temperature was in most cases kept below 400 deg. Fahr. with good results; he also had given attention to the question of cooling and stated that in L.C.C. shops cooling by means of a water spray was dropped years ago. He agreed with Mr. Good's remarks that the short time required for tires to cool in the air sufficiently to enable the tires to nip the wheel centre would not justify the use of water on high tensile steel tires.

He appreciated the point made by Mr. Fearnley as to taking off tires, and mentioned that in the L.C.C. shops, tires are removed by being cut through with a hack saw and he thought this must be cheaper than using gas. He mentioned that the use of studs for fixing tires had been discarded in L.C.C. practice some years ago. The unequal wear of tires, as shown by the author's diagrams, he thought was the experience of most tramway operators and he knew, and probably they all knew, of cases of ½ in. difference of diameter of the two tires on one axle, although both tires had been made from the same cast. A great many troubles were primarily brought about owing to the wheels on the same axle being of different diameters, notably the excessive side rock and boxing of four-wheel cars. He had always been able to cure these troubles by re-turning the wheels to equal diameter and he agreed that it was desirable to re-turn wheels at as frequent intervals as is compatible with economy from a commercial point of view.

Referring to the gauges exhibited by the author he mentioned that similar gauges are in use in the L.C.C. shops and that to insure correctness and interchangeability limit gauges are used for the wheel centres, and tires bored to gauge in bulk are taken from the bulk, treated and shrunk on without trouble. He asked the author to say what he meant by "motors running against each other" as being a condition producing unequal wear of tires. The proper maintenance of truck frames was obviously most important, and

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in L.C.C. practice care is always taken to square the trucks whenever they are in the shops. There was one matter about which he did not think the author had made enough, namely, the value of oil and heat treatment of tires. He had made a number of experiments in this direction, and the results were very remarkable and indicated that a considerable improvement in the life of tires could be obtained as a result of such treatment. As an example, he mentioned the results obtained by test of specimens cut from two tires from the same cast and of similar analysis.

Treatment.	Tensile Test. Breaking Tons per sq. inch.	Reduction of Area. Per cent.	Elongation on 2 in. Per cent.	Brinell Hardness Figure.	Abrasion Test. Grms. removed.
None	55·35	18·4	12·0	192	*2·14
Heated to 1,500 deg. Fahr., dipped in oil 60 seconds, then allowed to cool in air (oil used, colza and rape seed)	78·03	33·6	14·0	262	*1·42

* Rate of travel, 1,200 ft. per minute. Total travel, 10,000 ft. Size of specimen, ½ in. × ½ in. × 1½ in.

He hoped that the question of heat treatment of tire steel would receive the attention it deserves as soon as working conditions permit and the opportunity presents itself.

Mr. R. H. WILKINSON (general manager, Huddersfield Corporation Tramways) thanked the association for the opportunity of being present and Mr. Norton for his instructive paper. He had been deeply interested in the question of tire wear. He would like to give them the result of his experiences with differential gears. He had fully expected to save repairs and also reduce the wear of the tires, though that was not the object of fitting the cars with those gears. He was surprised to find there was no saving in the wear of tires as against the ordinary gears. The difference only amounted to about 3,000 miles in the life of a tire. It was somewhat difficult to understand why that should be so. They worked a route of level track and it was all single. The results were not what he anticipated. Differential gears had brought to his notice that the flanges all wore out in the same manner. The author had suggested that studs should not be used to secure tires to the wheel centres. He did not use studs himself, but took the precautions of caulking over the inside. Huddersfield was not troubled with corrugation.

The PRESIDENT announced that Mr. Norton would reply to the discussion in the association's *Journal*.

RETURN FARES.

Mr. A. V. MASON, M.I.E.E. (general manager and electrical engineer, South Metropolitan Electric Tramways and Lighting Company), in introducing the subject of "Return Fares" said:—

This is a heading, not a paper, but a few "potted" heresies to promote discussion.

For instance, the war has taught me many things—that women make excellent conductors, and that the average woman is quicker in taking fares than the average man; that passengers unconsciously connive at dishonesty apparently under the impression they save the girls trouble by saying "Don't worry about a ticket"; that half fares for children are popular and remunerative. Another is that a lot of time can be saved and accidents avoided by collecting fares on the platform; that return tickets are a convenience to passengers as well as to conductors, and that the same thing applies to weekly tickets. I am also of opinion that the odd halfpenny values on the 1½d., 2½d., and 3½d. tickets for single journeys can with advantage be discarded. It is true I have only flirted with these innovations during the war in a mild sort of way, but even flirting is instructive, and the experience is invaluable.

After the war receipts are bound to drop, but I rather think that expenses, certainly labour, will remain high (and the higher the better from the tramway point of view, that is, of course, if applied to other trades). Material will not drop to the pre-war price for a long time, and repairs will be heavy, as not only have the cars and tracks been overtaxed, but necessarily often neglected. The question, therefore, arises from the dividend aspect—Where is the money to come from? From the ratepayer, the shareholder, or the public? Undoubtedly from the latter.

Now, for sake of argument, every manager should say, "This tramway is my own private property, and I have certain fare restrictions. How can I make the largest net revenue?"

The obvious remedy is to raise all fares to the statutory limits. This is all very well in theory, but is it expedient?

As one method of expediency, if I personally owned a tramway with decreasing net revenues, I would experiment violently—curtail the 1d. fare to its statutory mile, divide this mile into four portions so that overlaps were frequent, and then issue single fares at the sums of the penny stages—no odd halfpenny values—and return journeys; cheap return tickets would be issued for all fares above the penny. Here automatically the odd halfpenny values would reappear in the 3d. and 5d. returns. I think that I am correct in saying that 1d. fares are generally over 75 per cent. of all the fares taken, and in practice it will be found that the bulk of this traffic rides within the statutory limit of one mile, so that any suggestion of getting more out of the public must be fairly drastic. The chief grumble will come from the penny passenger, who is turned into a 3d. return, but the short distance penny passenger can nearly always travel his statutory mile by reason of the four overlaps. The B.E.T. have the credit for the four overlaps, and I believe the L.U.T. for the three. When we think in decimals the overlaps will be five to the 1d. stage.

The 2d., 3d., and 4d. fares would be the sum of the penny fares, but these passengers could always take return tickets at greatly reduced charges, especially to joy riders.

The fares would be:—

1 mile	1d.	single.	No return	1 mile	a penny.
2 ,,	2d.	,,	3d. ,,	1·3	,,
3 ,,	3d.	,,	4d. ,,	1·5	,,
4 ,,	4d.	,,	6d. ,,	1·5 to 1·65	,,

By this means the passenger returning on the same day would get a reasonably cheap ride, on the basis that the further a man travels the cheaper should be his fare—expediently, for there is generally more competition in price and time. The operator would get the fare in advance, and the conductors and passenger would be saved trouble in giving and getting change and tickets.

Fraud there would be, but what of it? If more money were brought in the system could stand a little peculation, which a few summonses would soon stop.

The next objection is method. The exchange ticket or overprints are self-condemned by their numerity, but the return ticket can be dated and cancelled by the punch. The punch loses its recording value, but this is less dangerous than exchanges, and the tickets are transferable, but why should they not be? The L.C.C. have featured the return fare in another direction on many lines, I believe, with excellent results, and their method of cancelling the ticket with a separate punch seems to get over most of the abuses. This punch at the moment is the L.C.C. property, I believe.

We will now pass on to the workman. The workman is protected by the ½d. per mile, and the operator is bound to give a sufficient service of cars before 8 a.m. and after 5 p.m. The unfortunate voteless shop assistant or clerk has to pay full fare. The overtime man is not catered for at all, as workmen's facilities are often only provided at the time the works pour out between five and six o'clock.

Here again we get back to the return ticket bought any time before 8 a.m. and home by any car at any time. I would give the workman the concessions provided for in the Act for the single journey with a further concession for the return journeys, and nothing more, on the basis of twice the number of stages as the ordinary passenger, and any one would get the facilities that got up early enough.

We now pass on to the shop assistant and school marm, who should be provided for by cheap fares, and who can be dealt with by a weekly ticket—travel one way before 10 a.m. and home any time. The ticket is simple, but the punch register is destroyed unless clippers are used. I use clippers. Why? Because my traffic staff still worship Baal. What we want is a passenger to be regular, wet or fine, and the weekly ticket provides this, being purchased soon after pay day before the weekly wage is spent.

What we want is some method to make the short distance passenger pay who only has the alternative of walking, and offer competitive attractive fares for the longer distance passengers and joy riders. Some may walk, it is true, but as I started I would run my tramway for cash and not for charity.

I put this forward as one means of getting, perhaps, some increased net revenue apart from a straight raising of fares.

Mr. C. D. STANLEY (general manager, New St. Helens and District Tramways) said he had only one suggestion to make on the paper, namely, the desirability of doing away with preferential fares, and especially the workmen's fares. It always seemed to him that tramway fares ought to be like other commodities; the price of them ought to bear a definite relation to the cost. In his notes Mr. Mason had gone a certain distance in that direction, but said that they should give the same facilities as regards fares to anybody who got up early enough. It was difficult to see why getting up early should be an essential. It cost no more to carry at 9 o'clock than to carry at 6 o'clock. What they did now was to give a preferential rate to workmen, which in practice meant certain types of workmen. In at least one city the practice was to fix a fare for a certain distance and make every adult passenger pay it. As far as he could see the results of that policy were exceedingly satisfactory. He quite agreed with tramway operators giving all they could both to workmen and ordinary passengers for a penny, but preference was given to a certain class of person which was uncalled for, and in his experience it led to a great deal of resentment on the part of other passengers, who were not getting

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workmen's fares. They rightly asked why they should not have the same facilities, and it was a very difficult question to answer. He thought the time had come when the whole subject of preferential fares for the working classes should be reconsidered.

Mr. H. ENGLAND (general manager, Yorkshire (West Riding) Electric Tramways), in criticising the paper, said he hoped Mr. Mason would take his remarks in the spirit in which they were made. He was quite aware Mr. Mason had written the paper with the object of creating discussion, and he had set out to invite criticism. In his view, Mr. Mason was entirely wrong in the opinions he had expressed; for instance, he said that women made excellent conductors. That might have been so in the early days when women were first employed, at which time women regarded it as a patriotic thing to undertake conductor's duties, but there had been a falling off, and the work was not nearly so well done now. There were many drawbacks to the employment of women as conductors, and he would much prefer to have the men back who previously did this work. That was, he thought, the general experience.

As regards return tickets, cheap fares for children, and similar concessions, mentioned in the paper, he totally disagreed that the granting of concessions of this kind was good for tramway revenue. In his opinion every passenger should pay the same fare for the distance travelled, and the business should be conducted entirely on an immediate cash basis, because return tickets, transfers, exchange tickets, and differential fares created loopholes for fraud, and there was really no reason whatever, in these days, why reductions on the ordinary fare charges should be made.

Mr. Mason had stated in his paper that if he personally owned a tramway with a decreasing net revenue he would experiment violently. This statement he did not agree with, because nobody was so conservative as a socialistic radical working man, and in the speaker's opinion to experiment violently with tram fares would be a great mistake. Before any change whatever was made in fares, the proposal should be very carefully considered indeed with the object of making as few changes as possible. To tinker with fares and alter fare stages for the purpose of experiment was a very hazardous procedure, and should not be undertaken unless there was a fair certainty that the change would be permanent. Mr. Mason had also said that after the war receipts were bound to drop. He did not agree with that view, because the general experience was that in all cases where increased receipts had been received, the tendency was for that increase to be maintained. It was quite true that none could forecast the future, but if high wages prevailed—as seemed likely would be the case—in the future, tramway revenue would undoubtedly benefit, and it was quite possible that the increases which had been obtained during the last two or three years would be maintained if not increased.

Mr. Stanley had stated in the discussion that he would like to see a revision of the workman's fare question. He was strongly of Mr. Stanley's opinion and really did not see why they should be compelled to carry workpeople earning very high wages at the rate of one halfpenny per mile. Reform in this direction, however, would probably mean Parliamentary intervention, and it was therefore hopeless at the present time.

Mr. G. W. HOLFORD (general manager, Salford Corporation Tramways) heartily thanked Mr. Mason for his paper though he hardly agreed with most of his remarks and suggestions, and submitted that though "flirting" might be instructive it was sometimes dangerous. As to the suggestion to divide the 1d. stage into four portions, if they were going to do this they must have conductors who were able to collect fares. Mr. Mason had said there might be "fraud" and asked, "What of it?" He feared that it would be of a very extensive character. He might say that he had had experience of return tickets on a fairly large system. They abolished them and he hoped never to see them again. His suggestion was to abolish them and all similar concessions which had been given in the pay and bring in a cash payment for all fares on one basis. He hoped they might do that in a year or two. He quite agreed with Mr. England that he saw no reason why tramway receipts should go down after the war. It was quite surprising how well tramway receipts kept up. Why on earth they should go down when the men returned and there was a larger population likely to use the cars he entirely failed to understand. They all knew they would have a large expenditure to meet, but they hoped they could meet it with increased receipts. There was objection to some of the other concessions Mr. Mason suggested. Within the penny zone of a tramway system it was exceedingly difficult to increase revenue. What they were doing in most towns in the North was to shorten the stages. Some towns had reached the statutory limit allowed by Act of Parliament, and the Board of Trade had been approached to allow them to charge more than the rates already fixed, but so far they had been informed that it was altogether impossible at the present moment. So with the smaller authorities he failed to see how they could improve their position while the war was on. He did not think they would obtain satisfactory returns even if the suggested concessions were given. Mr. Mason thought they would be successful because they would be "popular." Well, he quite agreed that anything given to the public would be popular, but whenever they tried to increase fares it was unpopular. He hoped Mr. Mason would have successful results, but personally he would rather await those results than experiment himself.

Mr. R. J. HOWLEY (joint manager, British Electric Traction Company) explained the present position of the negotiations which were taking place between the Council and the Board of Trade in regard to statutory fares. Several speakers had expressed the opinion that they did not expect any fall in revenue after the war. He thought that no one could say what the conditions were going to be after the war, but they hoped their revenue would be maintained. Everyone, however, agreed that expenses were going to be higher; wages had risen considerably and a great deal of that rise would continue after the war. The rise in wages would be reflected in the cost of materials, so that they must look forward not only to higher wages bills, but also to increased outlay on materials. There had been an increase in wages throughout the country, but he thought that the only industry which had been unable to meet that increased cost by a corresponding increase in the selling price of the commodity had been tramways. Tramways, as they knew, were limited by statute as regards the maximum fare which could be charged. In addition, many Acts of Parliament contained special fare restrictions which were statutory and could not be modified. It did not seem right that restrictions imposed in Acts of Parliament and Orders of the latter part of last century should be incapable of being varied when everything in the country was in a state of change owing to the war. The Council of the Association considered the whole question very thoroughly, and they decided to ask the Board of Trade to obtain from Parliament the power to review the maximum tolls and charges incorporated in the Acts and Orders, and if they thought fit, after such review, to vary them. An analagous case was the restriction on the maximum amount to be charged for electricity. In all recent Electricity Supply Acts and Orders provision was made for the Board of Trade to hear an appeal in regard to rates, and they had power if they thought fit to increase those rates. It seemed to him a reasonable request to ask for a similar form of appeal in regard to tramway fares. He did not think there were many cases where an appeal would have to be made, but at the same time it was most desirable that the machinery for such an appeal should be provided, and he hoped that the whole industry would support the representations of the association to the Government. At the present time the negotiations had got little further than the preliminary correspondence with the Board of Trade, but he thought that the conference would like to know the views of the Council on this important matter. (Hear, hear.)

STANDARDISATION OF CONDITIONS OF LABOUR AND RATES OF PAY.

By E. H. EDWARDES, A.M.I.E.E.

Mr. E. H. EDWARDES, A.M.I.E.E. (manager and engineer, Lancashire United Tramways), submitted the following notes:—

In opening this discussion I am fully aware that it is surrounded by many difficulties; but I am of the opinion that if we unite our efforts these difficulties will be surmounted.

You all realise that the great question we shall have to deal with after the war is that of labour.

Labour long ago came to the conclusion that the best and most satisfactory method of dealing with conditions of labour and rates of pay is to become united. With that object in view, the present system of trade unions was formed, with the result that practically all the great trades in the country are now governed by trade unions and, we must agree, so far as the employees are concerned, with great success. Some of us are still, no doubt, averse to these systems, but I think we may safely say that amalgamation amongst workers has come to stay, whether we like it or not. What we now have to consider is the best and most businesslike method of dealing with the problem.

It must be admitted that the tramway industry throughout the country is most disjointed. Even the various negotiations with Government departments have to be carried through by the two Associations instead of one, which involves a considerable amount of overlapping. Further, each authority, without consultation with one another—even in cases where inter-running arrangements are in force—settles its own labour troubles independently, often with disastrous results, which are becoming more and more obvious every day. What I should like to put before you is the possibility of forming a united tramway federation to deal with these complex problems. There is nothing original in the idea, as it is already in force in most great industries in the country, and I see no reason why it should not be accomplished in the tramway industry, which is becoming more and more important every year.

It must not be assumed that the proposal is that a standard rate of wages should be established for the whole country; but that the country should be divided into areas, and the rates of wages fixed in such areas in accordance with the cost of living, etc., in such localities. This is the system adopted by such trades as engineering, building, etc.

Do not imagine that, by forming a united tramway federation, the object in view is to squash or oppose the various unions of workers,

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but simply to treat with them on a uniform basis and in a business-like manner, in the same way in which they treat with us.

At recent arbitration proceedings before the Committee on Production a complaint was made by a representative of the men of the great variation in the conditions of labour for no apparent reason in various towns adjoining one another, and a remark was passed by the abritrator to the effect that it is a matter for regret that the tramway authorities do not work together in these matters; and I feel sure that if such a federation is formed by the tramway authorities it will be received with open arms by the Tramway Workers' Unions.

I should like to add that, at the suggestion of the Committee on Production, such a federation is in course of formation, the authorities in question comprising Lancashire and Cheshire Municipal Tramways, and practically all the undertakings in that area, including the companies, have promised to join; and a sub-committee has already been appointed, of which I am a member, to formulate a scheme, and I feel confident that the great majority of tramway undertakings throughout the remainder of the country would be equally pleased to join a central federation should one be formed.

I am simply putting forward these few brief points, on which I hope to enlarge when I open the discussion.

Mr. EDWARDES proceeded to open the discussion. He said:—I am bringing before you a subject, not only of great importance, but of great urgency. It no doubt bristles with difficulties, but if we pull together I feel sure these difficulties can be overcome, for all realise that the great question we have to deal with now, and certainly will have to deal with after the war, is that of labour. Labour long ago came to the conclusion that the best and most satisfactory method of dealing with conditions of work and rates of pay is to become united. With this object in view, the present system of trade unions was formed, with the result that practically all the great trades in the country are now governed by trade unions and, we must agree, so far as the employees are concerned, with some success. Some of us are still, no doubt, averse from these systems, but I think we may safely say that amalgamation amongst workers has come to stay whether we like it or not. What I should like you to consider is the best and most businesslike method of dealing with these trade unions. I think it must be obvious to all that the one and only way is to become united ourselves. What have we now? Each undertaking is a little world of its own; each settles its own wages question, conditions of labour, etc., independently. The result is that rates of pay and conditions vary in nearly every instance without apparent reason, which all tends to make the men dissatisfied. This is most noticeable in cases where two tramway undertakings of similar size adjoin one another, and are closely allied through inter-running arrangements, but where the wages and conditions vary in many small details. Take, for instance, two tramways "A" and "B." "A" will pay a certain maximum rate and grant certain holidays with pay. "B" may pay a slightly lower rate, but grant more holidays than "A." A man leaves "A" to work for "B" and grumbles because his wages are less. A man leaves "B" to work for "A" and grumbles because his holiday period is reduced. Again, with regard to the question of allowance for signing on and off. One tramway might allow 20 minutes; another 30 minutes; and yet another 40 minutes. Further, on one tramway a man reaches the maximum rate of pay, say, in three years; on another tramway in four years; and on another tramway in five years. These are only a few of the many variations which, in my opinion, are entirely unnecessary.

What has been happening during the last twelve months? We all know there is in existence a Government Committee termed the "Committee on Production," and most of us have appeared before that Committee. Has that Committee come to stay? Personally, I think it has. I have lost count of the number of tramway arbitrations which have taken place before that Committee during the period referred to, but, as regards the group of Lancashire and Cheshire tramways, there have been three in a period of six months, and, at present, it looks as if there will be another shortly. Of these three arbitrations, one was in connection with an application for a general increase. An award was given to the men only. Number 2 was in respect to women workers. The women were granted an increase, no doubt owing to the fact that one of the tramways in Lancashire had already given their women employees an increase, and the arbitrator saw no reason why all the other twenty undertakings should not do the same. Number 3 was in respect to an application for a further general increase. An increase was granted during the present month, and we now understand that the men are very dissatisfied with the terms of the award because it has not come up to the award recently made in respect to the Birmingham district. Certainly one of these arbitrations would have been obviated if the undertakings had been united, and the existing dissatisfaction would also have been avoided. Many of us blame the Committee on Production because there appears to be no system in arriving at the awards; but can that Committee be blamed more than ourselves; and do you not consider that tramway undertakings would have been better off, and the men more contented, if the whole of the tramway industry had been united, and one joint arbitration taken to deal with the whole industry, instead of the present system of separate undertakings, or even separate groups of undertakings, approaching the Committee on Production? No useful purpose will be served, however, in reflecting on what is and what might have been.

What I should like you to consider is, what can be done without any further delay. The proposal I wish to put before you is the possibility of forming a united tramway federation to be controlled by one central committee, with district or area committees. It must not be assumed that the proposal is that a standard rate of wages should be established for the whole country; but that the country should be divided into areas, and the rates of wages fixed in such areas in accordance with the cost of living in such localities. I admit there is nothing original in this proposal, as it is the system which has been carried out with success in connection with our main industries in the kingdom, and I see no reason whatever why it should not be accomplished in the tramway industry, which is becoming more important every year. I also wish to make it quite clear that, in forming such a united tramway federation, the object in view is not to quash or oppose the various unions of workers, but simply to enable us to treat with them on a uniform basis, and in a businesslike manner, in the same way as they treat with us. There is, I regret to say, a drawback, as regards the tramway industry, in bringing forward a proposal such as this; and that is the fact that we have two associations instead of one. This must be perfectly obvious to anyone in the tramway industry, and more than noticeable by a Government department which, when approached in regard to any matter concerning the welfare of tramways generally, has first to meet one association and then the other, although the issue at stake might be identical in each case. If however you are of the opinion that it is too much at present to expect the two associations to amalgamate, I see no reason whatever why, for the sake of this wages question alone, a central committee should not be formed out of the two associations. I must point out here that, at the suggestion of the Committee on Production, such a federation is in course of formation, the authorities in question comprising 21 tramways in Lancashire and Cheshire. As far as I know, all the authorities have joined except one, which may, I think, be considered most satisfactory. These undertakings include both municipal and company tramways and a sub-committee has already been appointed to formulate a scheme; and I see no reason why it should not be possible to do in the remainder of the kingdom what has already been done in Lancashire. I should, however, like to point out that the benefits arising out of these federations would be greatly reduced if such federations are formed independently of each other without a central authority which, in my opinion, is absolutely essential. I have briefly outlined the subject, and earnestly trust that, after the discussion, a resolution will go forth from this Congress as to the advisability of forming such a United Tramway Federation.

Mr. G. W. HOLFORD (general manager, Salford Corporation Tramways), in giving support to the paper, explained that he had been jointly interested with Mr. Edwardes in forming the federation referred to by him. Many conferences had been held between the Corporations and companies operating in Lancashire and Cheshire, and up to date those conferences had been most successful and had done excellent work, but they did not want it to go forth that such conferences or any other conferences of a similar character were being formed in antagonism to any trade or labour organisation. It was entirely in the interests of the industry generally they desired to work. It was not beneficial to either party that matters affecting wages and labour conditions should be settled simply between one little authority and one small branch of the unions, and then to find next week some different terms had been arranged in a neighbouring town, by which dissatisfaction arose and trouble was created. They desired to eliminate these troubles, not only in their own undertakings, but in others running into or through their systems. They felt sure that if areas were formed most of these differences would disappear. He believed such areas could easily be settled between representatives of tramway undertakings and of the employees' trade organisation.

He had been informed that the example of Lancashire and Cheshire had already been followed by Yorkshire and he hoped that it would not be long before similar organisations had been formed in the Midlands and the Southern Counties. Perhaps at the present time they could not progress so far as to have a central organisation. The Corporations and companies had often recently had occasion to appear before the Committee on Production, but he was pleased to say they had always been unanimous in the line of action to be pursued before the Committee and there was no real difference between them. It was most satisfactory and interesting to be associated with them all. They were now engaged in forming areas for the two counties concerned, so that they could have their scheme ready, as recommended by the Committee on Production, when the war is closed. He strongly urged that something of this kind was necessary to deal with labour troubles, which were among the greatest difficulties they had to face now, and would be so after the war. Some such system as that outlined had been adopted by the engineering trades and many other trade unions, and for the life of him he could not see why the same principles should not be applied to the tramway industry by arrangement between the

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tramwaymen's unions and the Corporations and companies concerned.

Mr. R. J. HOWLEY (joint manager, British Electric Traction Company) remarked that on reading the paper the matter seemed to divide itself into two parts; one was the question of standards and conditions of work, the other the question of pay. It was quite within the scope of the association, he thought, to deal with the question of uniformity in such matters as working conditions, hours, allowances, expenses, and so on; but he was very doubtful whether it was right and proper for the association to deal with wages questions. It seemed to him that the first thing to be done was to standardise working conditions, and that was a matter which not only that association, but also he ventured to suggest their friends the Municipal Tramways Association might see their way to take up, the two bodies working together in the matter. As regards rates of pay, which must vary in different parts of the country, he thought that matter could best be dealt with by the local undertakings in each district coming together and forming a wages board.

Mr. H. L. WHITE (manager and engineer, Great Grimsby Street Tramways Company) entirely agreed with Mr. Howley. Speaking from the company point of view, he had always felt it was desirable that there should be a closer connection between Corporation concerns and company concerns, but he feared it would be very difficult always to take joint action in such matters as rates of pay, although he thought it ought to be possible for all concerns to act more in unison so far as the working conditions were concerned. Therefore, whilst welcoming Mr. Edwardes' suggestion that there should be an endeavour made to secure uniformity of working conditions, he saw great difficulty in the way of members of this Congress supporting Mr. Edwardes in his advocacy of a federation of tramway undertakings to deal with the difficult problems of pay.

Mr. W. T. ROBSON (general manager, Southampton Corporation Tramways) said that he was intensely interested in Mr. Edwardes' paper, but still more interested in the remarks with which he introduced the subject to the Congress that afternoon. He fancied that Mr. Edwardes was looking ahead perhaps more than some of them realised, and he quite agreed with him that there were many difficulties in the way of getting a uniform rate of pay for England or the country as a whole. For instance, he had in mind three towns in the South of England where the rents were entirely different in each, the cost of living was quite different, and things generally were in each of those towns on an entirely different grade. But at the same time there was very much that might be said in favour of the scheme which Mr. Edwardes had suggested, and it was apparently being acted upon to some degree, or perhaps experimentally, at the present time in the Lancashire district. He wished it every success and at any rate he hoped the Council would be given an opportunity to go most thoroughly into the whole matter. He did not think that Mr. Edwardes went so far as to suggest that that meeting should put forward any proposition as regards standard rates of pay, but he certainly hoped the question would be referred to the Council for consideration.

Mr. E. H. EDWARDES, replying to the discussion, said in reference to Mr. Howley's remarks that it was really a very difficult matter to separate conditions of labour and rates of wages, because in so many instances conditions of labour really was only a matter of wages. He failed to understand Mr. White's remarks, because in reading his paper he had distinctly emphasised the fact that he did not for a minute assume that the wages throughout the kingdom were going to be the same, but that they should vary according to the cost of living in each area. He again said that emphatically, but Mr. White seemed to think the proposal was that a small town in Lancashire should pay the same rates of wages as the London County Council. He was the last person to think that and he did not know where Mr. White got his idea from. Mr. White thought it absurd, but as already explained, there was no foundation for the criticism. He could not see that a federation of tramway undertakings was impracticable; the principle had been applied in other directions and to other industries, and what had been done with them could be done with tramways. All he had brought the subject up for was that it should be considered very seriously by the Council, and although, as he had admitted at the beginning, the proposals presented some difficulties, still he thought they could be got over. He hoped the Council would go into the matter thoroughly at the earliest possible moment.

WOMEN DRIVERS.

By ARCHIBALD ROBERTSON.

Mr. ARCHIBALD ROBERTSON (manager, Greenock and Port of Glasgow Tramways) submitted the following:—

Brief résumé of the Greenock and Port Glasgow Tramways Company's experience of women drivers. Their conduct generally with special reference to time-keeping; qualifications for handling heavy cars in busy industrial centres; climatic conditions experienced in the West of Scotland; comparison with men drivers with regard to accidents; conduct in cases of sudden emergency; prospects of continuing to employ women as drivers in normal times.

Mr. ROBERTSON then opened the discussion. He said:—I believe the Greenock and Port Glasgow Company was one of the first, if not actually the first, tramway company to experiment with women drivers and conductors. It will be readily understood that this was not from any desire to make a change, but from absolute necessity. On the outbreak of war a considerable proportion of our men at once enlisted, and as the various shipbuilding yards were very busy and paying high wages, men could not be got to fill the vacancies. A considerable proportion of our pre-war running staff were double-ended. Conductors who had qualified as drivers were at once put on to drive, and we set about training the men who had not already qualified as drivers, meanwhile filling up the vacancies on the back platform with selected women. As time went on more men left until we were faced with the alternative of putting on women drivers or drastically curtailing the service, and considering that about 70 to 75 per cent. of our traffic is munition workers' traffic, it will be readily agreed that stoppage or serious curtailment would have been disastrous. After very anxious and careful consideration, and I might add with considerable trepidation, it was decided to train a few selected women as drivers. The lady superintendent of the local labour exchange gave us valuable assistance in selecting the proper type, and after about four weeks' training the first batch of half a dozen was put on the road in charge of cars. The number was steadily added to until we had something like 80 per cent. of women on the running staff, that is, conductors, drivers, and checkers. Sixty-two per cent. of drivers were women. I do not know whether the military authorities in the north are more exacting in their demands than in the south, or whether our men volunteered more readily, but I know that but for the assistance of the women it would have been impossible to have maintained anything like a full car service.

The experiment of putting women on the front platforms was an immediate success. The first lot received perhaps a longer period of training than some of the later lots, and probably a little more attention than is usual in the cases of male drivers. After a month's training they were as efficient as good-class men with a similar period of training, and much superior to the class of men procurable nowadays. In Greenock, while we have no very steep hills, the cars are large 12-tonners, seating 74, the main streets are narrow, and congested vehicular traffic is heavy, and in parts the track is single with loops, so it says much for the capability of the girls that there is hardly an accident recorded against the first batch—certainly not a serious accident. I have a photograph of the main street taken last Saturday giving a slight impression of evening conditions. In the daytime it is, if anything, worse. The tramway system runs round the fringe of the town alongside the River and the Firth of Clyde. The larger proportion of the residential district is on the side of a somewhat steep hill away from the car track. The shipbuilding yards and other large works are alongside or near the track. The people from the residential districts find their way down to the main street which, particularly in the evening, has the appearance of a busy market square. Consequently to drive a heavy 12-ton car successfully requires both skill and nerve. I have already said that the first lot of drivers had a good record in regard to accidents, but this early good record has not been maintained in its entirety. Some of the later girls apparently think they have as good a right to have a "dunt" at a lorry as their male colleagues have. Some of the later lots of girls trained were as a whole hardly so satisfactory as the first lot, although many of them individually were quite as good.

We were somewhat concerned as to how the drivers would stand the winter. Greenock has a somewhat unenviable reputation in regard to rainfall, and storms are not unknown. The route is fully exposed to the gales which blow down the lochs branching off the firth. Here again I was agreeably surprised. While the "missed turns" were more frequent than during the summer, necessitating a larger duty sheet, the girls stood the cold remarkably well. Rain and snow did not daunt them; the only conditions which seemed to frighten them was a "greasy" rail. There were more failures to report on a mild morning when rails happened to be "greasy" than on wet and stormy mornings. With the object of making the fronts of the cars more comfortable, we had vestibules fixed, but they were not wanted, and in fact the girls preferred the cars without them. Arrangements were made under which the crews on the late long shifts during winter got a cup of tea and a biscuit between 7 and 10 p.m. This appeared to be appreciated. When it was suggested that the hours worked per week should be reduced, it was found that they preferred to work similar shifts to the men. They are paid by the hour, and you would be surprised to learn the hours worked by some. While the experience has generally been favourable, there are one or two points that occur to me where they are perhaps not so reliable as men. While some of them have not lost a single minute's time in the course of 12 months, a proportion of them do not realise the necessity for punctual reporting. They appear to think that if they report within 10 or 15 minutes of the reporting time there should be nothing to complain about, and even when they do not turn out for work they sometimes neglect to send word.

We experienced some slight trouble at the beginning of last winter. A munition factory employing many thousands of girls

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at good wages was started at a place within easy train reach of Greenock, and the novelty combined with the more congenial nature of the inside work during the winter appealed to our girls and many of the best of them easily got a start at munitions making. On the position being explained to the authorities, the practice of taking our girls was stopped, and most of them subsequently came back to us. To replace, at the time, the girls who went to the munition works we had hurriedly to engage and train others, and as good type girls were increasingly difficult to get, a few who perhaps would not in ordinary circumstances have been selected were taken on. Our experience is that employees should so far as possible be of a like class and that a good class. Unless good class girls be selected trouble is certain. I do not think that a girl is just as satisfactory in case of sudden emergency as a well-trained man. As a rule a large proportion of them are more "nervy," although there are cases when they have acted as coolly and efficiently as a man could. A sudden fright appears to take more out of them. I have known cases where a woman to avoid an accident has acted in every way absolutely correctly, stopped the car, and afterwards fainted away. In this connection it must be kept in mind that women drivers are a recent innovation, while the staff of male drivers is the product of years of training and practising (a few new ones being added occasionally), so that with men the right thing to do in every case is done almost automatically and without the necessity of thinking. In the case of women entirely new to the work this was at first not so, and in this respect they may be considered inferior to men, but with longer experience they have become more efficient, until now they are very little, if anything, inferior. You cannot, of course, put a large number of untrained women (or men, for that matter) to any work to which they have not been accustomed and have them as efficient in a few months as others who have been years at the work. One might just as well expect a crowd of female workers in engineering works to be as expert fitters as men who have served five or six years' apprenticeship.

The innovation was received well by the public, and the girls get on fairly well with the passengers. Much depends on the manner and disposition of the individual girl. It has been noted that the greatest grumblers are women, and that the male workers have been with few exceptions courteous and forbearing, especially when they are comparatively new to the work. Drivers are not brought into such close contact with the passengers as conductors, but bearing on the humour or tact displayed by the conductors I might mention an incident which actually occurred. A man and boy got on a car, and the man claimed that the boy was under 6. The conductress asked for his name and address. "What for?" said the man. "So that we can get his birth certificate and send it to the school authority," she quickly replied. The proper fare was at once paid. (Laughter.) In conclusion, I might say that in my opinion, so far as the running of the cars is concerned, these could generally be fairly efficiently worked by women, provided there is plenty of time given to train them properly and that the proper type is selected. It is advisable, however, that a proportion of the drivers be reliable men; this is to ensure assistance in case of accident. In training women drivers, it will probably be found necessary to reject a larger proportion than in the case of men, and, of course, some systems are more favourable for experiment than others. Work on a level track is easier. Considering that in three or four months 50 per cent. to 60 per cent. of drivers were replaced by women, who had until then never thought of working a car, the results have been wonderful. In Greenock we were fortunate in that the few male drivers over military age left with us were good and sensible men. They did their utmost to assist in training the women, so that munition workers' service could be maintained. Without the assistance of the men our difficulties would have been much greater. We have also a few women driving our big commercial omnibuses. This is a recent innovation (a couple of weeks), but they appear to be shaping all right. The following are our complete figures:—

Percentage of female drivers—Greenock 62 per cent., Rothesay 71 per cent., Coatbridge 33 per cent.

Percentage of total female running staff—Greenock 69 per cent. (76 per cent. leaving out spare time men), Rothesay 59 per cent., Coatbridge 54 per cent. (65 per cent. leaving out spare time men).

Maj. F. Coutts (general manager, Paisley and District Tramways Company) said that his experience was quite the opposite to that of Mr. Robertson. As conductors women were quite good, and they got along with them very well, but with women as drivers they had been rather unfortunate. They had made every effort to train them as drivers, because they were anxious that the army should have as many men as possible. They started to train 39; only 13 survived the training, and there were 26 who gave it up before the passing-out period arrived. Of the 13 who passed out as trained, he had only one left, so that a percentage of one out of 39 seemed to be their result. Perhaps their conditions were a little bit more difficult than those on Mr. Robertson's system. The grades were very heavy, and he thought that almost exclusively the trouble had been side strain. They had paid workmen's compensation to these girls for racked sides and so forth. He did not know how most systems were going on with this proposal to employ women drivers. Of course, they had been told that Glasgow had successfully trained them and he had recently made some inquiries and had a census taken at different points in the city, with the following interesting results:—

Cars passed.	Women drivers.	Percentage.
296	18	6
78	7	9
355	20	5·3
371	40	10·7
1,121	79	7

Adding the whole lot up, there would be an average of 8 per cent. Perhaps that was very good, but he did not think it was anything to make a noise about. If they only got 8 per cent. after two years, the war would have to last for 20 years before they got all the cars controlled by women.

Perhaps Paisley grades were against them. They had no magnetic track brakes and no protection in the front of the cars, whilst Glasgow was differently situated in these respects. Mr. Robertson had apparently been very successful in training them in Greenock; perhaps they had not to turn out so early there as on his system. On the Paisley system the traffic was heavy in the respect that during the workers' rush hours morning and evening, for an hour and a half they ran three times the number of cars that they did at any other time of the day. Thus a very large proportion of drivers had to turn out early, somewhere about 4.0 a.m. The traffic was almost exclusively for munition workers, and in that respect they were in a rather unique position. To expect the girls to turn out at a quarter to four on a wild winter morning was perhaps rather more than they could expect or had a right to expect. Taking everything into account, they did not turn out so badly at first, but later on as winter crept in they did not turn out nearly so well. The girls gave up the driving, and they were faced with the fact that they did this though they were getting 6s. 6d. more bonus for driving than conducting, and being in the North they could understand that would not have been given up lightly or without sufficient reason. They would think twice before they gave up such a good job, and therefore he was forced to the conclusion that they could not stand the strain and racking. Their success was too limited to justify them going any further with the scheme.

He would, however, like to know something about the position in regard to accidents. Girls were certainly liable to lose their heads, and would drop their hands on getting into a tight corner or a greasy rail. Sheer funk in the early morning at having to take out and operate a car on a greasy rail was a very serious matter when they had to carry 14,000 munition workers. Failure to negotiate a greasy road and thus to delay the traffic was a very serious matter. He did not think on balance there would be any saving in handing the men over to the army and asking girls to do work which really was beyond them. He did not think in the interests of the country they were justified in doing it any longer.

With regard to timekeeping, they had greatly improved this lately by a system of bonus; they originally paid so much bonus per week no matter whether a man worked three, four, five, or six days, but they found that had not the slightest effect. So they altered it. Now a driver got 10d. per day bonus if he or she worked four days per week, 1s. a day bonus if he worked five days and 2s. 2d. a day bonus if he worked six days. Now no one overslept in a morning or forgot to wind up the alarm as they used to do. A little money woke them up. As a substitute for girls he had tried to get boys. He was recommended by the Tribunal to get boys of 17 to 18. He did so and trained them, only to find that a new Order came out and they were called up just as they had finished training. He next tried boys of 16 to 17, and he scoured the North of Scotland for a week and came back with a net catch of five. So if anybody wanted boys they had better not go to Scotland for them. He thought these facts might have some useful bearing on the paper. Clearly they were not successful in training women drivers in all places; possibly with easy level tracks and suitable routes it might be different, but with him the scheme had been a total failure.

Mr. C. D. Stanley (general manager, New St. Helens and District Tramways) reminded the Congress that there was one other important point in connection with the employment of women as drivers, i.e., the labour difficulty. Some time ago he had been asked to train women to drive in order to release men, but the objections were not withdrawn. He agreed to undertake it if the Government would guarantee on their part that there should be no labour troubles owing to the men coming out. That guarantee had, he understood, not yet been given.

The Secretary (Mr. A. de Turckheim).—It applies to London.

Mr. Stanley said if he had put women on his cars the men would have come out at once.

Mr. H. P. Hogg said the question had been forced on them in one place in the north. They had very great diffidence in starting the women. The traffic was in a colliery district and was very rough. The men went into the towns on Saturday and when they came out they were very difficult to handle. However, they tried the women, who apparently were used to dealing with men drunk or sober, and as conductors they were a great success. They managed the men

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extremely well, and the cars were very crowded on Saturdays. It was quite surprising what they had been able to do, and when they first started they never believed it would be possible for women to cope with such traffic conditions. That was their experience, but they had not tried them for driving.

Mr. MASON said that if women were put on in London, every car would be run into the shed. The union said they were not going to have women drivers. They appeared to manage things differently in Scotland. Paisley tramways appeared to be able to do what they pleased. But he thought that tramway operators would have to consider the question of using women or else of shutting up. He thought that it was only a question of engineering skill to get over the difficulty of the strained side. It was practically a question of brake power, of doubling the leverage or in some way making the work less difficult for the women. Then the problem would only be one of the runaways downhill or in those places where women could not really drive the cars. Every tramway manager used to say that women conductors were absurd; now they could not get enough of them. It might possibly be the same with driving.

Mr. ROBERTSON briefly replied, and the conference then concluded.

THE ASSOCIATION DINNER.

The annual dinner took place in the evening at the Trocadero Restaurant, and was, as in other years during the war, quite informal, without music, speeches, or toasts.

The Right Hon. Viscount Chilston (the president) occupied the chair, and the following were present :—

G. S. Albanese.
R. Armitage, M.P.
O. H. Baldwin.
Geo. Balfour.
J. Barnard.
E. Barralet.
J. Beckett.
H. R. Beken.
E. Benedict.
W. W. Beaumont.
C. Bickersteth.
H. E. Blain.
F. Bland.
F. Bourne.
K. W. Brooks.
J. Browning.
J. K. Bruce.
C. L. Buckley.
I. Bulfin.
C. D. Burnet.
Major Burpee.
W. C. Burton.
F. Burfoot.
Lieut. C. D. Bruce.
S. H. Callow.
Lieut. B. T. Cameron.
John Cameron.
J. F. Cameron.
J. M. Cater.
A. W. Chambers.
W. B. Cheyney.
Rt. Hon. Viscount Chilston.
A. W. A. Chivers.
Sir Fred Clarke.
F. Coates.
T. W. Cole.
—. Compton.
H. P. Conibear.
A. T. Cooper.
Lieut. R. W. T. Corbett.
Major F. Coutts.
A. Coveney.
Harris F. Crookes.
C. Davidson.
A. de Turckheim.
T. P. Easton.
E. H. Edwardes.
H. England.
A. R. Fearnley.
A. L. C. Fell.
F. A. K. Fergusson.
E. H. Fleming.
W. E. Freir.
Geo. Fry.
J. Fry.
S. Garcke.
Geo. Gerrish.
J. B. Glenn.
T. B. Goodyer.
J. B. Hamilton.
W. E. Hardy.
L. E. Harvey.
R. J. Howley.
W. H. Hawley.
D. Hays.
F. Hewer.
G. W. Holford.
A. J. Hollington.
L. A. Hunt.
Jos. Hunter.
W. S. Hopking.
F. Irvine.
Ald. W. Ivey.
A. H. Jackson.
H. M. Jacob.
A. Johnson.
J. J. Kelly.
B. Kingsford.
C. J. Knight.
E. H. Lean.
S. A. Ledger.
H. W. Littler.
W. L. Lorkin.
H. Lotery.
U. McCabe.
A. McCallum.
W. L. Madgen.
C. W. Mallins.
H. Martin.
A. V. Mason.
H. F. Maynard.
Coun. R. Mayne.
J. C. Mitchell.
A. C. Morrison.
J. F. Moss.
H. Mozley.
E. M. Munro.
Lee Murray.
D. R. Myers.
A. New.
A. Norton.
W. B. Pickering.
E. S. Quilliam.
H. B. Renwick.
A. Robertson.
W. T. Robson.
C. W. Rooke.
F. E. Saunders.
H. M. Sayers.
H. Scholey.
S. Sellon.
S. F. Shears.
W. Shearer.
R. T. Simcock.
L. Slattery.
H. K. Spark.
C. J. Spencer.
M. O. Spicknall.
Hon. A. Stanley, M.P.
C. D. Stanley.
G. V. Stanley.
H. M. Stevens.
C. G. Tegetmeier.
W. Thom.
L. O. Thornbury.
A. Toms.
H. E. Townell.
W. H. Twake.
—. Troughton.
W. C. Ullmann.
W. W. Walkley.
A. H. Walton.
H. L. White.
H. R. White.
A. G. Whyte.
R. H. Wilkinson.
A. M. Wilcox.
H. L. Williams.
A. E. Wray.
W. Wyld.

After dinner, on the proposal of the President, the toast of the King was duly honoured.

The Hon. Arthur Stanley, intervening in the *post prandial* conversation, remarked that although speeches and toasts were not on the programme, he thought all present would like to drink to the health of their president.

The President thanked them for the cordial reception he had received, and explained that he had intruded at their congress ("No!") that afternoon because he thought he would like to see more of the business side of the association. He certainly appreciated the papers that were read, and more than once he felt inclined to join in the discussions, but on the whole perhaps he acted more wisely by "sticking to his own last"—so he had remained silent in the chair. More than one of the topics had, however, attracted his attention, such as the conditions prevailing after the war and women tramcar drivers. He thought that after his visit to that afternoon's congress it was very probable that he would attend the next one, and if he did so he might be tempted to join in the discussion. He had certainly received the impression that there was a very businesslike side to the association. He fully sympathised with the managers present in the difficulties they must all have experienced in carrying on their business—difficulties which had been so largely increased by their staffs being called up for service in the war. However, he hoped that when the time came round for their next meeting they would find themselves in happier circumstances. But he could not shut out the thought that there would be serious difficulties to contend with even when the war was over, and it would be for their Council to try to devise wise methods for meeting those difficulties.

ELECTRIC POWER SUPPLY COMMITTEE.

Mr. Roberts, for the Board of Trade, informed Mr. Gilbert in the House of Commons on June 25, that the members of the Departmental Committee on Electric Power Supply in England and the interests they represented were as follow :—Mr. F. Huth Jackson (chairman), Mr. J. Falconer, M.P., Sir Charles Parsons, Sir John Snell, and Sir James Devonshire (Electrical Trades Committee); Mr. John Kemp and Mr. C. H. Herz (Coal Conservation Sub-Committee of the Reconstruction Committee); Mr. J. F. Crowler (Irish interest); Alderman C. F. Spencer, of Halifax (local authorities owning supply undertakings); Mr. G. H. Hume (London County Council); Mr. A. J. Walter, K.C. (Ministry of Munitions); Mr. H. H. Law (Local Government Board); Mr. H. Booth (Board of Trade).

The chairman, Mr. Roberts added, had recently resigned on the advice of his doctor. The President of the Board of Trade was taking steps to appoint a new chairman, and also to increase the representation on the committee of local authorities owning electric supply undertakings.

In the end of June it was officially announced that Sir Archibald Williamson, Bart., M.P., had consented to act as chairman of the Committee in place of the Right Hon. F. Huth Jackson. The following representatives of local authorities owning electric supply undertakings were also added to the Committee :—Mr. W. B. Smith, Mr. Harold Dickinson, and Mr. E. F. Vesey Knox, K.C.

Sir Albert Stanley, President of the Board of Trade, replying to a question by Mr. Gilbert in the House of Commons on July 1, said that there were three members of the Committee who were directors of electric power supply companies. As to the three new members appointed to represent the interests of municipal undertakings, Mr. Harold Dickinson was the electrical engineer to the Corporation of Liverpool, and was nominated to serve on the Committee by the Association of Municipal Corporations; Mr. Vesey Knox, K.C., had acted as counsel for many urban district councils owning electricity undertakings, and was nominated by the Urban District Councils Association; and Mr. W. B. Smith was a member of the Glasgow Town Council, who owned the largest municipal electricity undertaking in Scotland, and was nominated by the Secretary for Scotland on the recommendation of the Lord Provost of Glasgow.

BRITISH ELECTRIC TRACTION COMPANY.

The twenty-first ordinary general meeting of the British Electric Traction Company, Limited, was held on June 22 at the Holborn Restaurant, London, Mr. Emile Garcke, M.I.E.E. (the chairman), presiding.

The Acting Secretary (Mr. Thomas Bower) read the notice and the auditors' report.

The Chairman, in moving the adoption of the report, said that the stupendous expenditure by the nation and the employment of so many hands in the production of munitions of war, combined with restricted railway facilities, had had an effect upon the company's receipts akin to that which would be produced by great trade prosperity. The increased receipts, however, must be weighed against the increased expenses, and it was then seen that the balance of profits was not proportionate to the increased work done. The adverse conditions were both numerous and multiform. Prices generally, with the remarkable exception of tramway fares, had more than doubled since the beginning of the war, and were still rising. Wages had gone up considerably; taxation had increased; and restrictions on all forms of enterprise other than war work were enforced by all sorts of regulations, by dearth of labour and executive staffs, by prohibition against investment of capital other than for national purposes, and by feelings of uncertainty with regard to the future. The revenue account for the past year showed a revenue of £226,744 and an expenditure of £26,772, or a net profit of practically £200,000, which compared with £209,000 for the previous year. This reduction in net income was explained by a decrease in revenue of £17,000 and a decrease in debits of £8,000. This decline in revenue was due to the fact that, while the associated companies which had not done so well had reduced their dividends, some of those which had done better had not increased theirs, but it should not unduly depress them, because they knew it was the result of abnormal conditions arising out of the war. They were placing £15,000 to reserve (raising it to £425,000), paying dividends at the same rate as in the preceding year—6 per cent. on the preference stock and 3 per cent. on the ordinary stock—and carrying forward £97,598, compared with £86,428. At the end of 1915 the underlying companies—excluding the London companies—had total reserves of £1,300,000, and during the past year they had added £243,000, making a total of over £1,500,000, to which must be added the reserve and carry-forward of this company, amounting to a further £500,000. The investments stood at £4,285,000, an increase of £8,700 over the preceding year's figure. In War Loan and other Government securities this company and the associated companies held over £450,000, and the London companies a further £150,000. Referring to the question of tramway fares, the chairman

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said that, in view of the changed conditions, it was only equitable that the existing statutory restrictions should be reviewed by the Board of Trade or other Government department, and steps had been taken by the Tramways and Light Railways Association to have this question considered by the authorities. (Hear, hear.)

Having referred to the taxation on motor omnibuses (as reported in our motor traffic section), Mr. Garcke proceeded to express the hope that the Government would do something to remove some of the disabilities which restricted the best development of the electrical industry; and he urged that after the war it was imperative that this country should have a protected home market for its manufactures as a base from which, in conjunction with its colonies, it could keep a hold on international markets, and incidentally help to raise a part of the huge revenue which would be required for interest and redemption of war indebtedness. A continued policy of direct taxation to provide the major part of this revenue, as at present, would, he said, defeat its own object, for it would discourage the accumulation of capital, which was indispensable for new enterprise. From this point of view it was to be hoped that the excess profits tax would be withdrawn at the earliest possible date, for the excessiveness applied now to the tax rather than to the profits, and would deter enterprise and therefore check capital creation. With regard to the prospects of the associated companies, the view immediately before them was cloudy, but they saw a silver lining in the distance which bade them be of good cheer, for it indicated better times to come. (Applause.)

Mr. C. G. Tegetmeier seconded the motion, which was unanimously adopted.

FINANCIAL REPORTS AND MEETINGS.

Brazilian Traction, Light and Power Company have declared a quarterly dividend of 1½ per cent. on the cumulative preference shares.

Yorkshire (West Riding) Electric Tramways Company have declared an interim dividend of 3 per cent., being at the rate of 6 per cent. per annum on the 6 per cent. cumulative preference shares for the half-year ending June 30, 1917.

Dublin United Tramways.—The directors propose to declare interim dividends for the half-year ended June 30, 1917, at the rate of 6 per cent. per annum, less income-tax, on the preference shares, and at the rate of 4 per cent. per annum, less income-tax, on the ordinary shares. The dividend warrants will be sent out on August 4.

Rangoon Electric Tramway and Supply Company.—The gross profit for the year ended December 31, 1916, amounted to £68,653, including £57,817 receipts from the tramways and motor omnibuses. After making provision for all expenses, including depreciation and interest on debenture stock, there was a net profit of £22,199. Including the amount brought forward from last year, £2,783, and deducting preference dividend, there is a balance of £9,983. The directors recommend the payment of a dividend of 4 per cent. on the ordinary shares free of income-tax, leaving £2,903 to be carried forward.

Colchester Corporation Tramways.—The total revenue for the year ended March 31, 1917, was £15,933, the highest ever received, and an increase of £192 as compared with the previous year. The gross profit was £4,510, which is sufficient to pay interest and sinking fund, war bonuses and allowances, leaving a net profit of £24. The percentage of working expenses to receipts was 71·019, as compared with 67·79 in the previous year. There has been great difficulty in obtaining suitable motormen, and as a consequence many of the men have often worked seven days a week to maintain the services. No advantage has been obtained from the Government substitution scheme.

Delhi Electric Tramways and Lighting Company, Limited.—The report for the year ended December 31, 1916, shows that the receipts from the tramway undertaking were £11,135, and from the electric supply undertaking £22,934, being increases respectively of 16 per cent. and 13½ per cent. as compared with the previous year. The net revenue amounted to £11,593, and after deducting debenture interest, income-tax, and depreciation of plant and equipment, and including £895 brought forward from last year, there is a total available balance of £4,089. The directors propose to transfer £1,000 to renewals reserve account, to pay a dividend of 2 per cent. on the preferred share capital, and to carry forward £1,089. The amount of £4,000 has been charged to revenue to meet depreciation of plant and equipment, making the total reserve £10,000. A contract for a third Diesel engine has been made, and as it was impossible to obtain the necessary priority classification for a new dynamo, arrangements have been made to obtain an old machine locally.

London and Suburban Traction Company.—Presiding at the annual meeting, the Rt. Hon. Lord Stuart Wortley, chairman, said that their gross tramway receipts had increased during the year, but in the case of their omnibus companies there had been a falling off. The net receipts for 1916 were £1,306,335, a decrease of £3,600. The increase in expenditure more than swallowed up the increase in receipts, owing to bonuses to employees and the rise in the prices of materials. They had now to conform to an award given in May, under which for the year 1917 they would have to bear an additional charge for wages of about £17,000. The conditions caused by the war had seriously affected all the companies in which they were interested. In the case of the London United Tramways, for which a receiver had been appointed, it was, however, doubtful if the expectations of the net revenue, which were formed at the time of the amalgamation effected by the London and Suburban Traction Company, could have been realised. The cost of maintenance and repairs had been greater than was expected, and the elimination of competition had not been carried out to the extent anticipated. It was hoped that a better co-ordination of traffic facilities in Greater London would improve their results.

Imperial Tramways Company.—Presiding at the ordinary meeting of this Company in Bristol on June 27, Mr. Samuel White moved the adoption of the directors' report, and made feeling reference to the death of his brother, Sir George White, former chairman of the company. With regard to the Middlesbrough, Stockton, and Thornaby Tramways, though they carried more than half a million additional passengers, and their receipts exceeded £70,000 for the first time, there had been a considerable increase in the working expenses, with the result that the net revenue was over £1,000 below that of the previous year. The greatest credit was due to Mr. Freshwater, their manager, for the excellent manner in which he had discharged his trying duties. The Corris Railway had suffered from the abnormal conditions of the times. They had begun to build up a tourist traffic, but that had been knocked on the head. Their income for the year was £23,073, of which £14,228 was derived from the working of the Middlesbrough undertaking and the balance from dividends upon their other investments. It was sufficient to enable them to pay the 6 per cent. dividend upon their preference shares, interest upon their debenture stock, a dividend of 2 per cent. upon the ordinary capital, and to carry forward £123 19s. 10d. to the next account. When they returned to normal times there was no reason why things should not improve, and their business become extremely profitable. They could look forward with some degree of confidence to a better return upon their investments in the future. The report was adopted.

London United Tramways, Limited.—While the gross receipts for the year ended December 31, 1916, show a gain of £2,190 as compared with the previous year, owing to the additional cost of material and labour, expenses increased by £34,000. After adding the balance brought forward from last year, and deducting interest and all other charges and expenses, there is an adverse balance of £2,583. The directors anticipate that the results of operation in the current year will be even less favourable. Owing to these circumstances, and the fact that a large sum will be required for renewals and repairs, an application by a debenture stockholder for the appointment of a receiver had been granted, pending the preparation of a scheme for the reorganisation of the company's capital. A summary of the accounts for the past year and the two preceding years is appended:—

	1916.	1915.	1914.
Traffic receipts	£322,171	£318,341	£316,838
Advertising receipts	£6,000	£4,731	£5,957
Rentals	£679	£672	£592
Sundry receipts	£5,158	£6,422	£4,484
Balance brought forward ...	£2,327	£1,892	£2,101
Total receipts	£336,335	£332,058	£329,972
Debit balance carried forward ...	£2,583	—	—
	£338,918		
Power and running expenses ...	£155,405	£132,501	£140,304
General expenses	£21,471	£25,375	£27,251
Rents	£805	£602	£585
National Insurance	£1,070	£880	£997
To employees' benefit funds ...	£1,450	£1,503	£961
Payments to local authorities ...	£10,592	£10,767	£9,964
Repairs and maintenance ...	£77,473	£62,628	£60,484
Reconstruction and renewals ...	—	£25,000	£12,500
Interest on loan	£4,655	£4,478	£2,787
Interest on debenture stock ...	£65,997	£65,997	£65,997
Balance to be appropriated—			
Pref. dividend at the rate of one-half per cent.	—	—	£6,250
Balance carried forward ...	—	£2,327	£1,892
	£338,918	£332,058	£329,972
Mileage open at December 31 ...	53·5	53·5	53·5
Number of passengers carried ...	65,734,446	63,145,226	61,433,783
Number of car-miles run ...	7,494,898	7,744,894	8,996,891
Average receipts per passenger	1·17d.	1·21d.	1·17d.
Number of cars in stock ...	338	338	338

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Nottingham Corporation Tramways.—The results for the year ended March 31, 1917, are, under existing conditions, very satisfactory. The annual report shows that there was an increase in the receipts of £7,762, compared with the previous year. The working expenses, however, show an increase of £17,450, the balance being £64,438, as compared with £74,125. The increase in car repairs of £6,422 includes six new car bodies. Owing to the impossibility of obtaining the necessary material, permanent way renewals have been practically at a standstill, and only £2,217 were expended thereon. Since the commencement of the war 305 men have joined the colours, and 12 of these men have fallen in action. Upwards of 100 men have also left the service for munition and other work. In the circumstances much difficulty has been experienced in meeting the traffic requirements. Details of income and expenditure for the past year compared with those of the four preceding years are appended :—

Year ended March 31.	1917.	1916.	1915.	1914.	1913.
Total revenue	£203,155	£195,392	£179,315	£175,379	£167,180
Working expenses	138,717	121,266	112,583	108,422	108,274
Profit on working	£64,438	£74,126	£66,732	£66,957	£58,886
Interest	£16,495	£16,452	£13,833	£14,124	£14,349
Sinking Fund	8,459	8,459	8,442	8,132	7,839
Repayment of loans ...	15,715	15,714	15,290	12,138	11 923
Nottingham Corporation Bill	—	—	502	550	—
Net profit	£23,769	£33,501	£28,665	£32,013	£24,775
Contributions to rates ...	£10,000	£20,350	£22,500	£24,000	£19,000
Reserve fund	13,769	13,151	6,165	8,013	5,775
Passengers carried	47,480,934	45,741,208	41,210,964	40,535,874	38,484,032
Fare per passenger	1·02d.	1·01d.	1·02d.	1·02d.	1·02d.
Car mileage	3,766,411	3,885,322	3,789,857	3,543,669	3,485,789
Units per car-mile	1·70	1·64	1·53	1·51	1·65
Power cost per car-mile ...	2·39d.	2·25d.	1·91d.	1·89d.	2·06d.
Receipts per car-mile ...	12·94d.	12·06d.	11·35d.	11·87d.	11·50d.
Expenses per car-mile ...	8·44d.	7·49d.	7·13d.	7·34d.	7·45d.
Ratio of expenses	68·28	62·10	62·78	61·82	64·77
Total track mileage ...	44·25	44·25	44·25	37·40	37·40
Number of cars in stock ...	155	155	155	135	135

Metropolitan Electric Tramways, Limited.—The report for the year ended December 31, 1916, shows that including the balance brought forward from 1915, and deducting all expenses chargeable to revenue, and a provision of £22,158 for future reconstruction and renewals, there remains a balance of £37,796, which the directors propose to appropriate as follows :—Reserve account, £11,015 ; dividend on preference shares, £25,000 ; balance carried forward, £1,781. The traffic receipts show an increase of £43,515 as compared with the previous year, but this increase is more than counterbalanced by the growth in working expenses. The number of units sold by the North Metropolitan Electric Power Supply Company has greatly increased owing to the supply to power users engaged in the manufacture of munitions. A summary of the accounts for the past year and the two previous years is appended :—

	1916.	1915.	1914.
Traffic receipts	£504,338	£460,823	£462,415
Advertising receipts	£2,608	£3,213	£3,278
Sundry receipts	£7,691	£4,672	£14,553
Dividends and interest	£41,898	£42,473	£49,076
Rentals	£2,330	£2,380	£2,265
Balance brought forward ...	£1,532	£1,118	£1,052
Total receipts	£560,397	£514,679	£532,639
Power and running expenses ...	£232,226	£212,376	£229,665
General expenses	£31,049	£28,877	£30,637
Rents	£837	£640	£572
National Insurance	£1,252	£1,014	£1,214
To employees' benefit funds ...	£1,941	£2,084	£911
Payment to local authorities ...	£96,994	£95,503	£100,663
Repairs and maintenance ...	£91,258	£61,750	£65,795
Reconstruction and renewals ...	£22,158	£22,715	£10,500
Interest on loan	£6,720	£6,602	£5,512
Interest on debenture stock ...	£38,166	£38,843	£39,565
Balance to be appropriated—			
Preference dividend	£25,000	£25,000	£25,000
Dividend on ordinary shares	Nil	£4,743(1%)	£9,487(2%)
Reserve account	£11,015	£13,000	£12,000
Balance carried forward ...	£1,781	£1,532	£1,118
	£560,397	£514,679	£532,639
Mileage open at December 31 ...	56·25	56·25	56·25
Number of passengers carried ...	105,109,403	89,656,054	93,325,170
Number of car-miles run ...	10,681,787	9,686,525	11,479,592
Average receipts per passenger	1·16d.	1·23d.	1·20d.
Number of cars in stock ...	312	312	312

Sheffield Corporation Tramways.—The report for the year ended March 25, 1917, states that the maintenance of the services has caused a good deal of anxiety to the committee and management, who consider that they are fortunate in being able not only to maintain the services but to increase very largely the mileage on various routes. If the present rate of increase continues the number of passengers carried each day will shortly be equivalent to the total population of the city. In consequence of increased working expenses, the motor omnibus fares have been increased by approximately 25 per cent. A summary of the report for the past year, compared with those of the two preceding years, is appended : —

	1917.	1916.	1915.
Income—			
Traffic revenue	£519,281	£449,946	£391,535
Sundry receipts	£6,404	£5,663	£4,341
Total income	£525,685	£455,609	£395,876
Expenditure—			
Traffic expenses	£155,088	£132,399	£120,296
General expenses	£27,905	£25,460	£26,077
Repairs account	£68,483	£47,706	£45,385
Power expenses	£84,290	£65,284	£49,365
Total working expenses ...	£335,766	£270,939	£241,123
War allowances	£11,849	£11,210	£5,707
	£347,615	£282,149	£246,830
Gross profit	£178,070	£173,460	£149,046
Interest and sinking fund ...	£64,742	£63,818	£73,540
Income-tax on profits	£24,850	£13,862	£5,567
Street improvements	£8,381	£8,159	£7,882
Renewals fund	£34,698	£30,115	£30,018
Surplus fund	£1,180	£8,049	£7,163
Special purposes fund	£2,946	£2,000	£2,000
Grant to Sheffield University ...	—	£5,000	—
On capital account	£1,175	£601	—
Relief of rates	£40,098	£41,856	£22,876

Glasgow Corporation Tramways.—In the financial year ended May 31, 1917, the Glasgow tramways broke all records. As will be seen from the comparative abstract appended, the surplus to be handed over to the common good, which is the sum remaining after the payment of all charges and reserves, and may be regarded as the net profit, amounted to no less than £160,984, as compared with £43,548 in the previous year. This notable result has been obtained in spite of the fact that the payments to dependants of the men on active service and supplementary allowances have increased from £80,438 to £92,645. On the other hand, the traffic receipts show the very large expansion of £96,243 ; but against this there is an increase in expenses of £64,623. A notable item in the accounts is the growth in the income-tax, which has risen from £39,853 to £64,622, an increase of £24,769.

Year ended May 31.	1917.	1916.	1915.	1914.
	£	£	£	£
Traffic receipts	1,245,507	1,149,264	1,070,694	1,078,691
Sundry receipts	14,607	8,072	6,183	5,156
Total revenue	1,260,114	1,157,336	1,076,877	1,083,847
Traffic expenses	395,736	350,186	345,625	332,546
General expenses	137,816	144,297	142,020	134,034
Maintenance and repairs	143,758	133,659	144,530	156,214
Power expenses	67,231	64,346	51,995	53,483
Clydebank bridges	879	516	—	—
	745,420	693,004	684,170	676,277
European War	92,645	80,438	51,817	—
Total expenditure	838,065	773,442	735,987	676,277
Balance carried to net revenue account	422,049	383,894	340,890	407,570
Dumbarton tramways	—	—	126	180
Interest on investments	78,637	81,203	65,701	64,809
Total	500,686	465,097	406,717	472,559
Deductions—				
Rent of Paisley lines	8,453	6,700	5,559	5,830
Interest on capital	78,846	90,474	78,797	82,921
Sinking fund	114,378	109,614	105,493	102,607
Income-tax	64,622	39,853	22,789	14,057
Parliamentary expenses	98	500	8,818	609
Renewal and depreciation	73,305	174,408	172,310	212,642
Total	339,702	421,549	393,766	418,666
Surplus to common good	160,984	43,548	12,951	53,893

The following are the traffic statistics for the year 1916-17 :—Average track mileage open (single), 196¼ ; car mileage, 25,786,047, increase, 822,738 ; traffic receipts, £1,245,508, increase, £96,243 ; traffic receipts per car-mile, 11·592d., increase, ·543d.; traffic receipts per passenger, ·769d.; increase, ·008d.; passengers, 388,294,876, increase, 25,923,412 ; passengers per car-mile, 15·059, increase, ·543.

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CONTRACTS AND ORDERS.

The Macintosh Cable Company's tender for cable has been accepted by Salford Electricity Committee.

The Vaughan Crane Company have an order from Birmingham Corporation for an electric hoist at £3,095.

Bruce, Peebles and Company, Limited, are to supply a motor converter to the Woolwich Borough Council.

The British Thomson-Houston Company are supplying a turbo-exhauster to Birmingham Corporation at £1,696.

A. Reyrolle and Company, Limited, have an order from Sheffield Electricity Committee for 25 transformer protection sets.

Willans and Robinson, Limited, are to supply a 3,500 KW. turbo-alternator, with G.E.C. motors, to Poplar Electricity Committee.

Cammell Laird and Company's tender for car tires has been accepted by West Hartlepool Tramways Committee at 42s. 6d. per set.

Edison Swan Electric Company have a contract to supply a storage battery to the Public Works Department of Queensland, at £1,281.

Brighton Lighting Committee have placed an order with the Underfeed Stoker Company for three travelling grate mechanical stokers at £3,087.

J. W. Courtenay, Limited, Amberley House, Norfolk Street, London, W.C., have been re-appointed sole advertising contractors to Gloucester Corporation Tramways.

The General Electric Company, Limited, London, have been awarded a contract by the General Post Office for the supply of Osram lamps for the period ending March, 1918.

British Insulated and Helsby Cables, Limited, are to supply to Cardiff Corporation 2,815 yards of three-core cable at £1,400 per mile, 90 yards of armoured cable at £99 per mile, and 465 yards of l.t. four-core pilot cable at £159 per mile.

Glasgow Tramways Committee have placed contracts as follow :—P. R. Jackson and Company, commutators ; Carron Company, chilled iron and scrap-iron brake blocks ; British Westinghouse Company, armature coils ; and Cookson and Company, trolley cord.

The British Westinghouse Company's tender has been accepted by Salford Corporation for switchgear required at Irwell Park wharf, and h.t. switchgear in connection with cable to be laid to Trafford Park sub-station and Blackfriars sub-station. W. T. Glover and Company, Manchester, have received a contract for cable.

Wolverhampton Council have conditionally accepted a tender from Willans and Robinson, Limited, for a 5,000 KW. turbo-alternator set, with condensing plant and auxiliaries, steam motor-driven pump, piping and connections, and air filtering plant, at £22,690 ; and from the Stirling Boiler Company, Limited, for boiler plant at £24,687.

Manchester Tramways Committee have accepted the following tenders :—National Rail and Tramway Appliances Company, Limited, Liverpool, cast-iron brake blocks ; A. Pearce and Son, Sheffield, steel points and crossings, malleable cast-iron, light iron and wire ; Shelton Iron, Steel and Coal Company, Stoke-on-Trent, steel tongue points, steel castings, and gear case castings ; Thos. W. Ward, Limited, Sheffield, steel files, tool steel ; Marple and Gillott, Limited, Sheffield, steel springs, copper cable, and small gun metal and brass. Among the tenders accepted for the supply of stores for the electrical department for one year were the following :—Morgan Crucible Company, Limited, crucibles ; Bullers, Limited, insulators ; Doulton and Company, Limited, insulators ; W. T. Henley's Telegraph Works Company, Limited, and Charles Macintosh and Company, Limited, cables ; British Insulated and Helsby Cables, Limited, tubing and accessories ; Simplex Conduits, Limited, tubing.

Formite Products.—By an arrangement with the Damard Lacquer Company, Limited, of 98, Bradford Street, Birmingham, Messrs. Pinchin, Johnson and Company, Limited, of 26-27, Bevis Marks, St. Mary Axe, London, E.C., have been appointed the sole selling agency for Formite Products in Great Britain and certain Continental countries. All communications in reference to Formite Products should in future be addressed to Messrs. Pinchin, Johnson and Company, Limited, Insulating Varnish Department, 26-27, Bevis Marks, St. Mary Axe, London, E.C.

Appeal to Local Authorities for Economy in Timber.—Tramway managers and permanent way and borough engineers are affected by a circular which has been issued by the Local Government Board urging the need for reducing the consumption of timber. The Board urge that the use of timber for road works should be confined to repairs, that the relaying of wood paving should be deferred, and that where works for the improvement of road surfaces cannot be postponed, the authorities should adopt some alternative method such as surfacing with asphalte or other bituminous material, or taking up a section of sound wood paving, which could be replaced with setts, and using the blocks for repairing worn-out places.

PERSONAL.

Mr. William Murray, tramways manager of Walthamstow, has been granted an increase in salary of £50 per annum.

Mr. S. T. Allen, electrical engineer of Wolverhampton, has been granted an increase in salary from £600 to £800 per annum.

Mr. W. C. Bexon, electrical engineer and tramways manager at Kilmarnock, has been granted an increase in salary of £100 per annum.

Councillors W. Hakes and **C. Raine** have been elected chairman and vice-chairman respectively of Hull Corporation Tramways Committee.

Mr. J. R. Davison, of Manchester, has been appointed mechanical engineer of Belfast central electricity station. He will take up his duties on July 24.

Mr. H. P. Stokes, electrical engineer and tramways manager to Bexley Urban District Council, has been granted an increase in salary of £100 per annum as from January 1, 1917.

Glasgow Corporation have granted increases in the salaries of the following officials :—Mr. T. W. Christall, claims superintendent, D. I. Laddell, outdoor traffic superintendent, £325 to £340.

Mr. J. W. Burr, borough electrical engineer of Swansea, with the consent of the Electricity Committee, is to give the Government authorities assistance in connection with the coal distribution scheme.

Mr. G. H. Wightwick has been appointed general manager of the Singapore Electric Tramways, Limited, in succession to Mr. J. H. Garratt. Mr. Wightwick has been in the employment of the company since 1905.

Mr. A. S. Channon, deputy electrical engineer of Grimsby, who has been in charge of the electricity station in the absence of Major W. A. Vignoles on active service, has been granted an additional bonus of £50 per annum.

Mr. G. Roberts, deputy engineer of Doncaster electricity and tramways undertaking, will take charge pending the Council's decision as to the rearrangement of work on Mr. Rayner's departure to accept an Admiralty position.

Mr. J. G. Thomson has been appointed boiler-house engineer at the Stuart Street station of the Manchester electricity department, in the place of Mr. J. R. Davison, who was recently appointed mechanical engineer of Belfast central electricity station.

The King's Visit to Newcastle.—Among those presented to the King and Queen during their visit to Newcastle on June 16 were Councillor R. Mayne, chairman of the Tramways Committee, and Mr. A. R. Sutherland, sheriff and vice-chairman of the Tramways Committee.

Mr. W. C. Burton was recently appointed a director of the London United Tramways, Limited, in succession to Sir Albert Stanley, who resigned in consequence of his appointment as President of the Board of Trade. **Mr. H. A. Vernet** was at the same time appointed an additional director.

Mr. Theodore Eastaway Thomas has been appointed development superintendent of the traffic branch of the London County Council tramways, at a salary of £800 a year. Mr. Thomas has for some time been commercial superintendent of the Metropolitan District Railway, the London General Omnibus Company, and the allied companies.

Mr. S. E. Fedden, general manager and engineer to the Sheffield Electric Supply Committee, has been voted an increase in salary of £100, to £1,000 per annum, with two further annual increments of £100 each. **Mr. H. E. Yerbury,** deputy general manager and engineer, has been granted an increase in salary of £100, to £700 per annum.

Mr. H. Dickenson, city electrical engineer, Liverpool, has been nominated by the Association of Municipal Corporations as a member of the Board of Trade Departmental Committee on Electric Power Supply. The nomination was made at the invitation of Sir Albert Stanley in order to meet the request for a larger representation of local authorities upon the committee.

Mr. R. L. Horsfield, tramways manager of Walsall Corporation, has been requested to give his services temporarily to the war staff of the Shipyard and Labour Department of the Admiralty, but the Tramways Committee are unable to accede to the request, being of opinion that Mr. Horsfield's services are indispensable to the tramway undertaking at the present time.

Mr. J. H. Garratt has resigned his position as general manager of the Singapore Electric Tramways, Limited, after an association of eleven years with the company. The chairman, Sir Frank A. Swettenham, at the meeting of the company on June 19, said that the directors hoped to be able on occasions to take advantage of his wide experience, both as a manager and an engineer.

Mr. R. O. Baldwin, of Bournemouth, has been appointed manager of Exeter Corporation Tramways at a salary of £300 a year, and took up his duties at the beginning of July. Mr. Baldwin has been traffic manager of the Bournemouth Corporation Tramways for some years past, and was previously in the service of the Bristol and the Doncaster tramways. Mr. H. C. Bartlett, manager of Exeter Corporation Tramways, has resigned his appointment.

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Mr. K. H. Campbell, borough engineer for Huddersfield, has received an honorarium of £500 for extra services rendered. Alderman Woodhead, in moving the payment, recounted extra work accomplished, including the conversion of the tramways at a cost of £258,556 for which he received no payment. He had also constructed four extensions outside the borough. Other towns not only engaged outside engineers to carry out such work, but had also remunerated their own engineers for the extra work thrown upon them. Alderman Wheatley challenged members to mention a tramways undertaking in Great Britain which had been constructed so cheaply.

Mr. W. F. Bladon, manager and engineer of the Barrow-in-Furness Tramways Company for the past twenty years, has received another important appointment under the British Electric Traction Company. The vacancy at Barrow has been filled by the appointment of **Mr. J. Dobson,** who has acted as assistant engineer and manager since October last, after serving the company in important positions in this country and abroad. During Mr. Bladon's service the tramways were converted from steam to electric traction. Before leaving Barrow Mr. Bladon was presented by the tramway employees with a gold watch. Mrs. Bladon received a satchel. Mr. W. H. Parsons, who drove the first steam car in Barrow in 1885, made the presentations, and Mr. J. Watson presided.

Mr. F. Dudley Docker, C.B., was re-elected a director of the Metropolitan Carriage, Wagon, and Finance Company at the annual meeting. In proposing his re-election, Mr. J. F. Cay said the chairman was practically the founder of the Federation of British Industries. Every step he had taken had been not only to help the company but to assist the good-feeling among the workmen. In acknowledging the vote Mr. Docker said he was feeling the strain, and the time would come when they would have to find a successor. He testified to the valuable services rendered by everyone connected with the company. In his main speech the chairman referred to the formation of the Federation of British Industries, and said that to achieve complete prosperity for trade and commerce there must be united action through such a national association. Mr. Docker also mentioned the good work already achieved by the National Alliance of Employers and Employed.

Mr. E. S. Rayner.—The fatuity which sometimes dominates Town Councils with reference to their most capable officers is well illustrated in the case of Doncaster Corporation. On June 16 last we reported that Mr. E. S. Rayner, electrical engineer and tramway manager to the Council, had been granted an increase of salary. As a matter of fact, he had been recommended by the Tramways Committee for the increase, and in the ordinary way it was to be expected that the proposal of the Committee who best knew his work and capabilities would be ratified by the Council. But when the recommendation came before the latter body it led to much debate, and in the end the increase of salary was refused. Mr. Rayner has been able without delay to make the most appropriate reply. As mentioned recently, he has obtained an appointment under the Admiralty. To complete the picture, it remains to be said that the salary paid the Doncaster manager and engineer by the Corporation was £450 a year, and that the Admiralty are going to pay Mr. Rayner £700 a year. Mr. Rayner is to be congratulated, while the Town Council of Doncaster may be cheerfully left to struggle to find a new engineer and manager. In these days it is not easy to find good men, and if the Corporation get into difficulties they will have few sympathisers.

WITH THE FORCES.

Major W. A. Vignoles, borough electrical engineer of Grimsby, who is on active service, has received the D.S.O.

Lieut. J. B. Snell, R.E., son of Sir John Snell, has been mentioned in despatches for exceptionally good work in the recent Soudan campaign.

Lieutenant Francis Arthur Ellis, Welsh Regiment, son of Mr. Arthur Ellis, city electrical engineer of Cardiff, has been severely wounded by a gas shell.

Mr. J. K. Grant, engineering assistant to the borough engineer of Birkenhead, has been appointed technical officer attached to a labour unit of the army.

Mr. R. W. Kennedy, late assistant editor of "Electrical Industries," has been promoted assistant inspector of the Aeronautical Inspection Department. On May 17 last he was gazetted temporary honorary lieutenant.

Mr. R. Allen, electrical engineer of Falkirk Corporation, has relinquished his appointment to join the Royal Naval College, Greenwich, to prepare himself for a commission in the Royal Naval Air Service.

Mr. A. W. Robinson, late publicity manager for Simplex Conduits, Limited, who has been serving as a gunner, in now undergoing a course of instruction at a cadet school prior to receiving a commission in the Garrison Artillery.

Private C. S. Pickett, 9th Battalion Royal Fusiliers, has been awarded the Military Medal for distinguished conduct in the field. Prior to joining the colours in November, 1915, he was engaged in the publicity department of Messrs. John I. Thornycroft and Company, Limited.

TRAMWAY AND LIGHT RAILWAY NOTES.

BATH.

A Track Paving Experiment.

Last year the Tramways Company made an experiment with a bituminous concrete for paving their track. The success met with is indicated by the use of the same material for the present repair of the track on other sections.

BIRMINGHAM.

Bonus to Encourage Economical Running—Wounded Soldiers' Rides.

Attention was directed by Councillor Marks at the June meeting of Birmingham Corporation to the consumption of energy per car-mile having increased from 1·9 units for 1915-16 to 2·002 for the past year. Councillor Harrison Barrow, chairman of the Tramways Committee, said the department had now reinstated the bonus system for motormen to encourage economical running, and they hoped to reduce the consumption to the pre-war standard. Since the war, however, the drivers had had to contend with the difficulty of more heavily-loaded cars. The Birmingham and Wigan Tramways Committees have restricted the number of wounded soldiers travelling free on any single car to half a dozen. It was pointed out at Wigan that as many as 90 had boarded a single car, and that colliers and mill operatives had had to walk.

BLACKBURN.

A Blackburn Corporation car accidentally knocked down a two-year-old child who ran in front of it. In his evidence the motorman stated that he was proceeding slowly, and he pulled up in less than half the car length. Replying to the coroner, he said he could not have stopped more quickly; the slower the speed the longer the electric brake took to act. The Coroner: So there is some safety in driving more quickly. Witness: The brakes act more quickly.

BOLTON.

Communication with a Railway Station.

The Tramways Committee have adopted the general manager's report on the proposals to alter the terminus of the Bolton cars on the Moses Gate route from the present position in Gravel Hole Brow, near the goods entrance, to a point opposite the centre of the square in front of Moses Gate Station. It will be necessary to construct a new cross-over.

BOURNEMOUTH.

Substitution in Materials.

The general manager of the Corporation Tramways in his annual report says:—"The abnormal and high prices of all materials, the difficulties of obtaining permits, and the impossibility of obtaining any requirenents in many cases have made it necessary in several cases to adopt substitutes. All copper, malleable iron, and steels are unprocurable, and the outlook for future supplies does not look like improving. Thanks, however, to the loyalty and good work of the staff, all these difficulties have been met." Councillor Bell, chairman of the Tramways Committee, commenting upon the report, said that when it again became possible to buy rails the prices would be greatly enhanced. A very large sum would have to be expended on renewals.

CHESTERFIELD.

Purchase of Motors and Gearing from Belfast Tramways.

During the general inability to secure materials for renewals, tramway managers have for some time been solving some aspects of the problem by purchases from their respective undertakings. Thus the Chesterfield Corporation Tramways Committee have bought eighteen tramway car motors with gearing from the Belfast Corporation for the re-equipment of some of their cars. The price agreed upon is £2,000.

HUDDERSFIELD.

Motormen and Fares.

At the termini of the tramways the motormen see that the passengers alighting by the front platform do not leave without paying their fares. In a summons against a spinner, it was stated that the conductor had not finished collecting when the car arrived at the market-place. Defendant and others came down the front staircase, and the driver asked if they had got tickets. Two went back for theirs, but defendant said he had got one and left the car. The driver was doubtful. and called an inspector. The fine was ten shillings.

KEIGHLEY.

Extension of the Generating Station.

An extension of the Corporation electricity station has been opened by the Mayor. The undertaking was inaugurated in 1901 for supplying energy for the tramways and for lighting, but industries now take a greater part of the output. Mr. Harry Webber, borough electrical engineer and tramways manager, in a souvenir booklet, states that the enterprise has for five years been self-supporting, with a fairly reasonable margin of profit going to the reserve fund, while paying a fair proportion towards the general district fund. The price per kilowatt for the whole undertaking is only £15·38;

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probably as low as any in the United Kingdom. The price obtained during the year ended March, 1916, was ·86d., averaging the returns of traction, lighting, and power, the rates of charge varying from 5d. per unit to a little under a halfpenny. In 1910 the plant capacity was only 740 kilowatts; now it is 10,000.

LEEDS.

Tramways Aid to Food Production.

Leeds Education Committee have started a scheme to enable volunteers from the schools to give one day's work in a fortnight to farmers whose land is within easy reach of a tramway. Tramways are proving a convenience to cultivators of new allotments on the outskirts of towns.

LIVERPOOL.

Upkeep of Leased Tramways—Employees Aid the Red Cross Society.

Bootle Council have entered into a fresh agreement for a period of twenty-five years from July 1 with Liverpool Corporation for the repair and maintenance of the Bootle tramways. Liverpool is to pay a rental of £500 a year for the first six years and £1,000 a year for the remaining period, and will be responsible for the upkeep of the rails and paving within the tramway limits, Bootle Corporation to do the final reinstatement work. Liverpool is to allow £43 per mile per annum for maintenance of the overhead equipment, which is to be handed over at the end of the period in a proper usable condition. All claims under the arbitration as to the upkeep of the tramway in the past are to be withdrawn, each party paying their own costs, and Liverpool will refund the amount of rent outstanding. The Tramways Committee have adopted a plan prepared by Mr. C. W. Mallins, the tramways manager, after consultation with the conductors, by which it is hoped to raise considerable funds for the Red Cross Society and the prisoners of war in enemy countries. Each conductor is supplied with £1 worth of Red Cross tickets, which are sold to passengers. There is no lottery in the scheme, and in six days it realised a sum of £660.

LONDON.

Women Conductors' Summer Uniform—Boxes for Uncollected Fares—Dishonest Passengers' Trick—A Record Day's Receipts—Omnibus Strike and Tramway Receipts.

Serviceable and becoming summer coats have been issued to the women conductors on the London County Council Tramways. The material is washable fawn with blue collar and cuffs. Owing to the difficulty of collecting all fares on a crowded car the manager of Leyton Urban Council Tramways, as already reported, has had boxes fixed on the cars, in order that passengers whose fares have not been collected may pay as they alight. The innovation is a convenience to honest people, and boxes in a prominent position and boldly labelled will possibly have the effect of reminding bilkers that they run the risk of the observation of the other occupants of the car, who will naturally take an interest in the experiment. The County Council are continuing their campaign against passengers who leave without having paid the fare. The prosecuting solicitor has stated that the common trick is to alight with a penny in the hand and offer it in payment if by chance they are stopped. Owing to the railway restrictions, and to the suspension of halfpenny fares and return tickets, the Whit-Monday receipts on the London County Council Tramways totalled £13,000, which is several thousand pounds in excess of the takings on any one day. At the Council's meeting on June 19 Mr. H. H. Gordon said that whatever view was taken of the fare changes, the traffic returns showed an increase of 5½ millions of passengers and of £42,000 for the four weeks ended June 6. The increased fares had been in operation only during the last fortnight of that period, but of the 5½ millions increase in passengers some 4 millions took place before the increase of fares. That increase was explained largely by the strike of omnibus employees. From the returns of East Ham Corporation Tramways for the period of the strike of omnibus employees we note that on the first day (Sunday) the car receipts showed an increase of £127. For the first four weekdays in the following week the increase was £680.

MANCHESTER.

Capital Expenditure for 1917-18—Electricity Committee's Estimates.

The continued restriction of expenditure owing to the war is seen in the Tramway Committee's estimates for 1917-18, providing for a capital expenditure of £721 on buildings and £1,142 on permanent way. The estimates of the Electricity Committee for the current year provide for an outlay of £171,000, of which part is for buildings for the new generating station.

NEWPORT.

Immediate Extension of the Tramways.

The Light Railway Commissioners, sitting at Newport, have sanctioned an application by the Corporation to extend the tramways from Commercial Road to the entrance to the Alexandra Dock, in order to provide for the transport of 1,500 workers engaged at a new factory. In the immediate future the number of employees will be 6,000. This extension was applied for in 1902 as a work required to complete the tramways, and the railways had now withdrawn the opposition to passing over their level crossings. The extension will be a little over three furlongs, and Mr. Nichols Moore, borough electrical engineer, estimated the total cost, including level crossings over the railways, at £13,062. In connection with this scheme the engineer advised the laying down of mastic asphalt paving on the tracks over part of the line, and the Council have entered into a contract with the Limmer and Trinidad Lake Asphalt Company, Limited, for the carrying out of this work. At the meeting of the Council on June 12, the engineer submitted tenders for the construction of the light railway, and reported that the prices were so greatly in excess of the estimate that he advised the work should be done by direct labour. This recommendation was adopted.

NORWICH.

Cars to Give Air Raid Warning.

Norwich tramcars, in the event of a daylight aircraft raid warning, will bear a notice, "Hostile Aircraft Approaching: Seek Shelter."

SHEFFIELD.

Automatic Trolley Reversers in General Use—Women Conductors More Expensive—Great Munition Traffic.

On the Corporation tramways there are now 90¼ miles of trolley wire in use, and during the past financial year 5¼ miles have been renewed. The undertaking has twenty-four automatic trolley reversers in operation. There has been some newspaper correspondence on the refusal of the City Council to pay the women conductors a war bonus equal to that of the men. The salient point to be drawn from the remarks of Sir Wm. Clegg, chairman of the Tramways Committee, in submitting the bonus resolution to the Corporation, and around which the controversy has been waged, is that women conductors are not physically capable of rendering service equal to that given by men. The general manager estimates that 700 women are necessary to do the same amount of work as 550 men; that is to say, 14 women are required to replace 11 men. In spite of that fact the women are paid the same wages as men, though on that basis they are worth only 25s. In other words, to do the same amount of work with women costs about £240 a week more, or over £12,000 a year. This sum is equivalent to a rate of nearly 2d. in the pound. Nearly 50 per cent. of the employees are women, there being 1,088 women and 936 men, a total of 2,024. Of the 543 employees who have joined the forces, one man has returned permanently disabled and 37 have been reported killed or missing. During the past year, in order to deal with munition workers' traffic, the rolling stock has been increased by the purchaee of ten second-hand cars from the London County Council, and the stock now consists of 349 service cars, thirteen stores, etc., cars, and twenty-two motor omnibuses.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

Applications for Letters Patent.

High-speed electric locomotives (7,679)—British Thomson-Houston Company and F. W. Carter.

Motor road vehicles (7,709)—G. F. Campion.

Devices for propelling railway rolling stock, etc. (7,766)—J. Neil.

Lifting jacks, etc. (7,849)—F. L. Rapson.

Transport vehicles propelled by endless moving chain tracks (7,897)—Sir W. A. Tritton.

Trolley wheels for electric traction (8,012)—W. C. Ashbury and W. D. King.

Trailers for commercial motor vehicles (8,026)—J. Banks.

Spring suspension mechanism of motor vehicles (8,239)—Birmingham and Midland Counties Transport Company and G. E. D. Ralls.

Motor chassis (8,121)—J. Cox.

Braking or steering devices for motor vehicles (8,131)—J. Cox.

Electrical power transmission for motor vehicles (8,058)—Daimler Company and F. W. Lanchester.

Motor to drive vehicle on its own inducted electric current (8,089)—G. E. Harfield.

Speed gear for motor vehicles (8,484)—G. Barker and H. Stevenson.

Vehicle steering gear mechanism (8,321)—Caterpillar Tractors, Limited (*Holt Manufacturing Company*).

Chairs for railway sleepers (8,663)—R. Fairhurst and C. Heyes.

Reinforced concrete sleepers for railways (8,511)—P. Blair-Frost.

Automatic train stops (8,425)—National Safety Appliance Company.

Suspension devices for motor vehicles (8,635)—R. Esnault-Pelterie.

Automatic couplings for railways and tramways (8,334)—U. A. Tesorieri.

Electric locomotives (8,854)—British Thomson-Houston Company (*General Electric Company*).

Braking systems for electrically-driven vehicles (9,061)—British Thomson-Houston Company (*General Electric Company*).

Light motor vehicles (9,068)—G. A. Dunball.

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Steering mechanism for motor vehicles (8,823)—C. H. Edye and C. L. Heyermans.
Electrically-driven road vehicles (8,937)—F. La Roche.
Change-speed gear and clutches for use therewith for motor vehicle engines (8,969)—H. Lindblom.
Signalling and train-stopping apparatus (9,035)—E. H. Whytehead.

Specifications Published.

1915

Train brake systems (18,213)—Sprague Safety, Control, and Signal Corporation.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.

Reversing controller for electric motors used on petrol electric cars (6,249—*105,956*)—W. A. Stephens.
Chassis construction on motor vehicles (6,905—*105,999*)—H. E. Buck.
Means for expediting and safeguarding railway traffic (15,429—*106,051*)—H. A. Thompson.
Automatic block signal systems for railways (4,337—*100,779*)—National Safety Appliance Company.
Air-brake apparatus (6,497—*100,636*)—California Valve and Air Brake Company.
Controlling mechanism for compound brakes (6,657—*106,131*)—Knorr-Bremse Akt.-Ges. and W. Hildebrand.
Automatic train-stopping mechanism (6,814—*101,785*)—National Safety Appliance Company.
Track belt for motor vehicles (8,463—*106,353*)—A. Kegresse.
Electric controllers for vehicles (9,702—*106,358*)—C. P. Elieson and E. G. Payne.
Temporary axles for motor road vehicles (12,002—*106,381*)—J. B. Brown and D. Cairns.
Automatic air-brake systems (12,167—*101,348*)—Sprague Safety, Control, and Signal Corporation.
Rail dressing machines (14,581—*106,413*)—W. E. Hanshue.
Spring mountings for motor vehicles (18,371—*106,437*)—Birmingham and Midland Counties Transport Company and G. E. D. Ralls.
Motor vehicles (7,298—*106,525*)—A. Bonfa.

40,000 Employees Subscribe.—As an indication of the general interest of electrical workers in America in providing the sinews of war, the following information taken from the *New York Times* is illuminating:—Over 40,000 employees of the General Electric Company of New York have subscribed for $3,000,000 worth of Liberty Loan Bonds, an average of $75 per individual. The subscriptions were received from the Schenectady, Lynn, Harrison, Fort Wayne, Erie, Pitsfield, and other works of the company, as well as from their district offices, and are symptomatic of the attitude of the whole of America.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1916. WEEKS ENDED. June 3.	June 10.	June 17.	June 24.	1917. WEEKS ENDED. June 2.	June 9.	June 16.	June 23.	AGGREGATE. Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	50,805	48,644	49,888	48,580	51,765	54,115	48,420	52,296	25	1,287,420	+ 8,087
Auckland	21,152	(28 days)	...	...	21,742	(28 days)	...	...	48	259,101	+ 6,043
Calcutta ... ... Rs.	63,676	63,208	64,281	66,419	65,367	64,050	66,259	65,969	25	1,685,060	+ 19,840
Madras ... ... Rs.	...	(14 days)	30,277	...	...	(14 days)	32,142	...	23	375,924	+ 34,832
Pernambuco	2,829	2,880	2,930	2,729	3,814	3,882	3,725	4,145	25	94,754	+ 17,769

Companies Issuing Monthly Statements.

	1916. Jan.	Feb.	March.	April.	May.	June.	1917. Jan.	Feb.	March.	April.	May.	June.	Wks.	AGGREGATE. 1916-17.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	3,399	3,512	3,881	3,727	...	...	3,521	3,196	3,422	4,611	...	...	4	4,611	+ 884
Brazilian Traction Mlrs	6626000	6276000	6913000	6882000	7304000	...	7266000	6872000	7549000	7453000	7864000	...	21	37,004,000	+3,003,000
Brisbane	32,280	30,320	34,275	32,575	33,150	...	33,020	29,800	33,340	31,620	33,340	...	21	161,120	− 1,840
British Columbia $	591,949	572,935	446,401	421,265	414,215	...	627,130	581,555	456,626	447,429	438,919	...	47	4,952,727	+ 290,427
Buenos Ayres Lacroze	40,595	39,137	42,219	40,220	40,220	36,213	38,142	35,977	41,337	39,111	40,595	38,020	52	464,077	− 25,457
Burma	21,906	20,345	22,958	22,191	23,585	...	23,803	22,912	27,132	23,660	24,906	...	44	257,416	+ 27,698
Cape Town	16,030	...	14,994	...	...	...	18,440	16,229	17,688	16,705	15,867	...	21	84,829	—
Carthagena & Herrerias	2,841	1,585	2,991	2,513	2,927	3,512	3,982	3,223	2,955	4,366	4,321	5,325	26	24,172	+ 7,803
Cordoba	12,335	11,831	13,598	...	...	...	12,437	11,898	13,098	...	...	...	52	160,683	− 1,223
East India	2,015	1,863	2,196	2,116	2,161	2,285	1,836	1,570	1,647	1,445	1,455	1,186	48	20,326	− 2,824
Kalgoorlie	2,236	2,249	2,479	...	...	...	2,431	2,193	2,772	...	...	...	13	7,396	+ 433
La Plata	4,533	4,345	4,611	4,354	4,342	3,735	4,315	4,092	4,527	4,229	4,126	3,852	26	25,144	− 781
Lima	...	...	34,169	33,542	33,966	...	...	...	37,569	37,807	35,321	...	21	181,809	+ 13,098
Manaos ... Rs.	...	...	...	...	...	...	146,493	144,532	161,156	...	...	...	—	—	—
Manila ... ... $	...	66,303	...	...	53,900	...	...	73,200	...	...	61,500	...	—	—	—
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	34,252	32,502	31,956	28,997	28,349	25,300	33,341	32,304	31,979	29,230	28,716	27,458	35	242,796	+ 1,728
Peruvian ... $	862,100	775,700	...	...	826,900	929,500	935,130	844,770	...	...	902,780	965,420	52	11,128,092	+1,364,595
Port Elizabeth ...	4,193	3,857	...	...	...	...	4,498	3,553	4,428	3,904	3,494	...	21	19,877	—
Rangoon	4,763	4,674	5,501	4,849	4,589	...	4,633	4,605	6,226	5,036	4737	...	21	25,237	+ 861
Toronto ... $	906,350	846,256	910,969	883,209	903,924	...	1002469	932,567	...	970,367	992,460	...	21	4,889,055	+ 438,347
Winnipeg ... $	297,560	293,250	296,500	282,498	276,980	...	319,945	280,717	293,094	265,594	259,794	...	21	1,419,144	− 27,644

(Continued on page 42)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1916. WEEKS ENDED.					1917. WEEKS ENDED.					AGGREGATE.		
	June 3.	June 10.	June 17.	June 24.		June 2.	June 9.	June 16.	June 23.		Wks.	1917.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Aberdare U.D. Council	356	351	447	389		557	453	405	415		11	4.839	+ 416
Aberdeen Corporation	2.088	1.855	1,785	1.840		2.434	1.821	2.972	2.228		3	6.446	+ 965
Accrington Corporation	*	...	...	...		...	...	...	...		—	—	—
Ayr Corporation	356	380	435	462		370	421	472	471		6	2.445	+ 94
Bath Electric	*	...	...	...		...	...	...	...		—	—	—
Belfast City	...	5,560	5,639	5,628		...	6.318	6.591	6,448		12	72.009	+ 5.098
Birkenhead Corporation	1.464	1,534	1.585	1.598		1.931	1.884	1.946	1.859		12½	20.895	+ 2.568
Birmingham Corporation	16.411	15.933	16.978	16.250		20.108	17,549	18.117	17.718		12	210.949	+ 12.315
Birmingham Corp. Motor Omnibuses	990	870	1.051	1.007		1.148	844	890	936		12	10.630	− 700
Blackburn Corporation	...	...	1.345	...		...	...	1.522	...		12½	18.236	+ 2,177
Blackpool and Fleetwood	649	544	1,543	1,024		1.454	901	844	810		23	11.864	− 665
Blackpool Corporation	*	...	...	...		...	...	...	...		—	—	—
Bolton Corporation	2.723	2.995	3.192	2.957		3.620	3.565	3.353	3.172		12	38.939	+ 3.113
Bournemouth Corporation	1.945	2.310	2.267	2.216		2.474	2.475	2.423	2.441		12½	28.533	+ 254
Bradford Corporation	6.515	6.200	7.729	6.725		10.048	7.321	8.271	7.647		12	89.745	+ 6.895
Brighton Corporation	1.103	1.143	1.259	1.230		1.673	1.499	1.534	1.426		12½	16.078	+ 2.024
Bristol	4.961	4.528	5,446	5.151		7.304	5.869	6.145	5.862		24	125.734	+ 8.933
Burnley Corporation	1.680	1.694	1.525	1,626		2.299	1.789	1,855	1.745		—	—	—
Burton-on-Trent Corporation	266	273	269	264		320	293	296	289		22	3.371	+ 193
Bury Corporation	1.336	1,360	1.816	1.569		2.059	2.057	1,690	1.554		12½	19.827	+ 1.669
Cardiff Corporation	*	...	...	...		...	...	...	...		—	—	—
Chatham and District	1.294	1.183	1.235	1.334		1.770	1.584	1.540	1.500		25	30.224	+ 2.011
Chesterfield Corporation	*	...	...	...		...	...	...	...		—	—	—
Colne Corporation	*	...	...	...		...	...	...	...		—	—	—
Cork Electric	551	508	544	585		623	585	655	663		25	12.475	+ 626
Croydon Corporation	*	...	...	...		...	...	...	...		—	—	—
Derby Corporation	1,108	1.067	1.174	1.134		1,413	1.192	1.221	1.183		12	13.794	+ 96
Dover Corporation	*	...	...	...		...	...	...	...		—	—	—
Dublin and Lucan	179	153	179	...		238	176	198	...		24	3.404	+ 396
Dublin United	6.508	6.092	6.558	6.890		7,892	6.836	7.367	7,630		25	156.449	+ 18.974
Dundee City	...	1.393	1.369	1.398		...	1.512	1.559	1.571		5½	7.789	+ 603
East Ham Corporation	1.350	1.308	1.318	1.376		1,618	1.449	1.500	1,413		12	17.178	+ 1.456
Exeter Corporation	385	364	407	392		433	407	426	420		12	4.526	− 6
Gearless Motor 'Buses	*	...	...	...		...	...	...	...		—	—	—
Glasgow Corporation	24.328	23.559	24.672	24.389		27.539	26.923	28.108	27,013		3½	91,571	+ 12,666
Glossop (Urban Elec. Supply Co.)	141	127	159	140		199	170	173	163		25	3.466	+ 135
Halifax Corporation	2.202	2.102	2.600	2.353		3.914	2.471	2.620	2,681		11½	27.751	+ 1.372
Halifax Corp. Motor Omnibuses	49	46	53	50		67	41	23	42		11½	487	− 54
Hastings and District	1.041	922	1.029	1.038		1.468	1.287	1.435	1.263		25	25.606	+ 4.281
Huddersfield Corporation	2.928	2.653	3.718	2.810		4.834	3.151	3.477	3.233		12	38.429	+ 2.703
Hull Corporation	3.106	3.074	3.158	3.163		3.683	3.322	3.394	3 380		17	39.504	+ 1.962
Ilford U.D. Council	700	645	692	690		956	783	773	757		12	8.978	+ 725
Ilkeston Corporation	*	...	...	...		...	...	...	...		—	—	—
Ipswich Corporation	613	551	602	604		903	707	751	708		12	7.295	+ 997
Isle of Thanet	337	309	355	366		492	354	356	440		38	10.317	− 153
Kilmarnock Corporation	161	161	170	188		180	182	183	183		5½	1.007	+ 43
Lanarkshire	2,336	2.310	2,358	2,574		2.923	3.066	3.144	3.065		25	63.940	+ 8.971
Lancashire United	1.819	1.652	1.892	2.126		3.063	3.431	2.559	2.495		25	50.757	+ 8.459
Leeds City	9.650	9,169	10.481	9.832		14,354	10.642	11.574	10.998		12	129.901	+ 13.582
Leicester Corporation	*	...	...	...		...	...	...	...		—	—	—
Leith Corporation	843	843	862	882		1,001	1,051	1.096	1.077		5½	5.819	+ 998
Leyton U.D. Council	1,724	1,554	1,618	1,750		2.376	1.958	2.057	1.898		12	22.903	+ 3.313
Liverpool Corporation	14.296	13.645	14.793	14.468		16,966	16.065	16.908	16.228		24½	367.036	+ 28.606
Llandudno and Colwyn Bay	323	339	571	447		500	383	372	393		29½	6.845	− 592
London County Council	49.409	47.603	47,611	48.866		62.596	56.833	58.184	55.323		11½	630.192	+ 79.173
London General Omnibus	*	...	...	...		...	...	...	...		—	—	—
London United	*	...	...	...		...	...	...	...		—	—	—
Lowestoft Corporation	*	...	...	...		...	...	...	...		—	—	—
Maidstone Corporation	206	192	195	203		291	251	244	238		12	2.751	+ 183
Manchester Corporation	18.868	17,617	20.852	19.339		23,554	21.298	22.062	20.934		12	244.503	+ 19.649
Metropolitan Electric Tramways	*	...	...	...		...	...	...	...		—	—	—
National Steam Car	*	...	...	...		...	...	...	...		—	—	—
Nelson Corporation	...	...	252	203		...	...	225	219		12	2.740	+ 75
Newcastle-on-Tyne Corporation	6.698	6.487	...	...		8.579	7.691	...	...		10	74.493	+ 11.932
Newport (Mon.) Corporation	*	...	...	...		...	...	...	...		—	—	—
New St. Helens and District	1,005	892	1,139	1,126		2.072	1.699	1.546	1.476		51	58.298	+ 7.520
Northampton Corporation	...	...	...	666		...	...	...	823		12	9.363	+ 1.031
Nottingham Corporation	3.852	3.663	3.924	3.896		5.592	4.172	4.473	4.386		12	49.363	+ 3.894
Oldham Corporation	2.302	2.447	2.908	2.591		3.168	3.396	3.053	2.744		13	36.271	+ 2.991
Portsmouth Corporation	2.802	2.472	2.757	2.727		3.420	3.330	3.344	3.074		—	—	—
Preston Corporation	1.070	1.032	1.340	1.037		1.517	1.131	1.197	1.192		11½	13.481	+ 710
Provincial	2.441	2.182	2.507	2.468		3.107	2.892	2.800	2.619		38	80.960	+ 62
Reading Corporation	836	760	827	826		1.198	1.031	1.081	1.088		11½	11.483	+ 1.859
Rhondda Tramways	1,237	1,187	1,554	1,315		2.301	1.505	1.573	1,558		25	35,198	+ 5.004
Rochdale Corporation	1,753	1,609	2.202	1,925		2.730	2.477	2.117	2.028		12	24.798	+ 2.342
Rotherham Corporation	1.392	1.571	1.539	1.573		1.782	1.718	1.759	1.683		12½	21.746	+ 3.761
Salford Corporation	5,277	5.374	6,374	5.576		7,732	6.776	6.966	6.382		12½	78.778	+ 11.069
Sheffield Corporation	10.133	10.226	10.981	10.685		12,966	11.753	11.986	11.609		13	150.539	+ 16.666
Southampton Corporation	1.638	1.503	1.629	1.712		2.195	2.008	2,072	2.077		11½	21.607	+ 3.161
Southend-on-Sea Corporation	837	797	872	849		1.422	1.204	1.026	1.003		12	10.409	+ 1.087
South Metropolitan Tramways	*	...	...	...		...	...	...	...		—	—	—
South Shields Corporation	819	783	809	820		1,132	908	964	940		12	10.846	+ 1.377
Sunderland Corporation	1.564	1.563	1.607	1.618		2.133	1.785	1.908	1.802		12	20.955	+ 1.824
Sunderland District	612	718	649	606		1.118	592	756	794		34	22.524	+ 2.869
Swindon Corporation	182	207	182	205		273	289	273	286		11½	3.045	+ 751
Torquay Tramways	588	504	626	634		782	657	695	712		25	13,097	+ 932
Tramways (M.E.T.) Omnibus Co.	*	...	...	...		...	...	...	...		—	—	—
Tyneside Tramways and Tramroads	624	602	620	667		1,404	871	1.002	1,035		25	17.867	+ 4,525
Wallasey Corporation	1.285	1,237	1,512	1.417		1.853	1.547	1.708	1,557		12½	17.416	+ 1.295
Walsall Corporation	800	796	954	798		1.305	875	931	910		12	11.135	+ 991
Walthamstow U.D. Council	1.172	935	1,070	1.127		1.753	1.350	1.330	1.242		12	15.008	+ 2.157
Warrington Corporation	478½	466	...	...		584	533	...	...		10	4.825	+ 230
West Ham Corporation	3.403	3,176	3.229	3.306		4,323	3.821	3.991	3.680		11½	43.511	+ 4.846
Wigan Corporation	...	...	...	1.654		...	...	...	1.921		3	22.379	+ 2.447
Wolverhampton Corporation	*	...	...	...		...	...	...	...		—	—	—
Yorkshire (West Riding)	1,631	1,761	2.059	1,718		3.316	2.311	2.145	2.047		25	49.518	+ 7.569

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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Extract from the Commercial Motor

June 21st, 1917

"Chariots of War I have Driven"

No. 5—The Daimler

By one of our "Despatches" Contributors

IT is probable that, of all the many motor factories whose products are in use by the British Armies, none has contributed so many chassis and components as the Daimler factories, not even excepting those turning out the ever-evident Ford. Wherever one goes behind the Western Front, Daimlers are features of the landscape. Consequently, thousands of drivers have obtained experience, or added to previous knowledge, of Daimler cars and lorries; and many have come to swear by them—not at them, as is the case with some makes! Daimlers of every kind, type and age seem to be represented, from the latest arrivals "just come out" to old impressed motorbus chassis or lorries which arrived on the scene in 1914, and are still running. Daimler touring cars, landaulets, limousines, light and heavy lorries and delivery vans—one could not escape them if one would, but their silence and sweet running make them rather attractive than otherwise. Then, of course, there are Foster-Daimler tractors for big gun haulage, to which the great Coventry workshops contribute some of the principal units, and last, but by no means least, the Tanks, in which are embodied important components of Daimler manufacture.

One of the chief attractions of Daimler lorries for the driver is their extreme simplicity. The number of parts that go to make up a Daimler lorry chassis is rather less than usual, so the ordinary driver finds those minor but constant attentions demanded by every war lorry well within his scope during the intervals between frequent journeys. One might almost say that Daimlers require rather less attention than other makes. For example, the flexible ring, leather or composition couplings do not need lubrication, and they make no demand on the driver's time, except for an occasional inspection, and, possibly, tightening of the bolts. The absence of separate torque or thrust members involves a minimum of lubrication and cleaning time. There are no external pipes, gauges, indicators or pumps forming parts of the engine lubrication system. Oil has only to be poured into the crankcase filler, and the lubrication then takes care of itself. These are points which commend themselves to drivers and make for the most efficient maintenance of a chassis by reducing the number of parts that have to be regularly watched, cleaned, lubricated or tightened.

No mistake can be made about over-oiling the motor or back axle, because the maximum oil level is determined by the height of the fillers. One merely pours in as much oil as is needed to fill right up, which method is the acme of simplicity. It has seemed to me that the filler lids could be improved on by the addition of a rim to exclude dirt.

As a rule, the adequacy of the springing of Daimler lorries is less open to criticism than that of most solid-tyred road vehicles. Their adoption for passenger work on such a large scale, and the use of an exactly similar system of suspension on L.G.O.C. vehicles is a striking tribute to the comparative efficiency of this particular type of springing. Perhaps, too, the Daimler's resiliency has largely contributed to its success on war transport, a success attained despite features of design that were unacceptable to the War Office M.T. Committee prior to the war, features which, it was generally considered, would not stand up under the onerous conditions of war service.

Daimler

The Daimler Company, Ltd., Coventry

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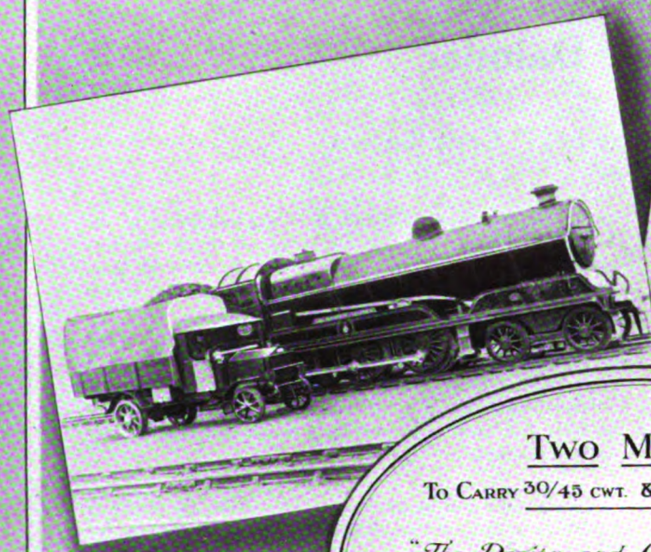
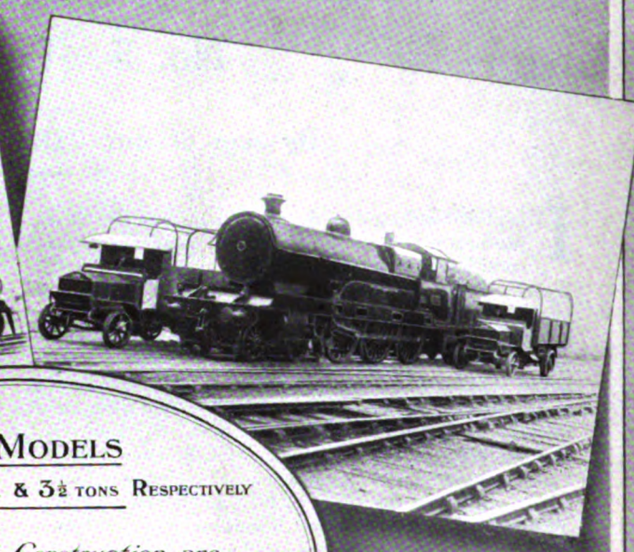
MOTOR VEHICLES.





TWO MODELS

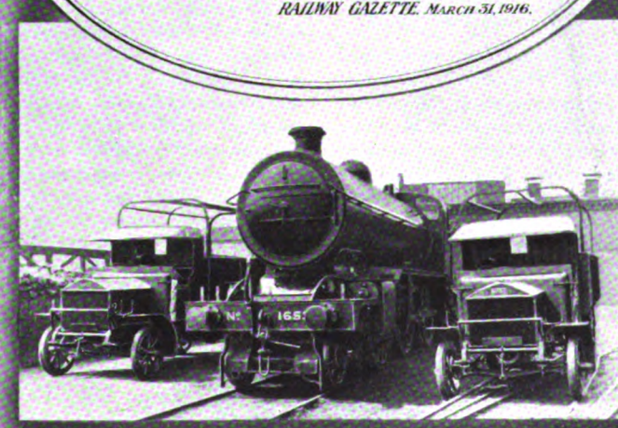
TO CARRY 30/45 CWT. & 3½ TONS RESPECTIVELY

"The Design and Construction are Throughout of a Character, which it would be Exceedingly Difficult, if not Impossible, to Improve Upon."

RAILWAY GAZETTE, March 31, 1916.

IN PEACE

USED BY THE LARGEST CARRYING COMPANIES AND COMMERCIAL HOUSES.



IN WAR

USED BY THE BRITISH AND ALLIED GOVERNMENTS.

D·NAPIER & SON LTD.

WORKS
ACTON, LONDON.
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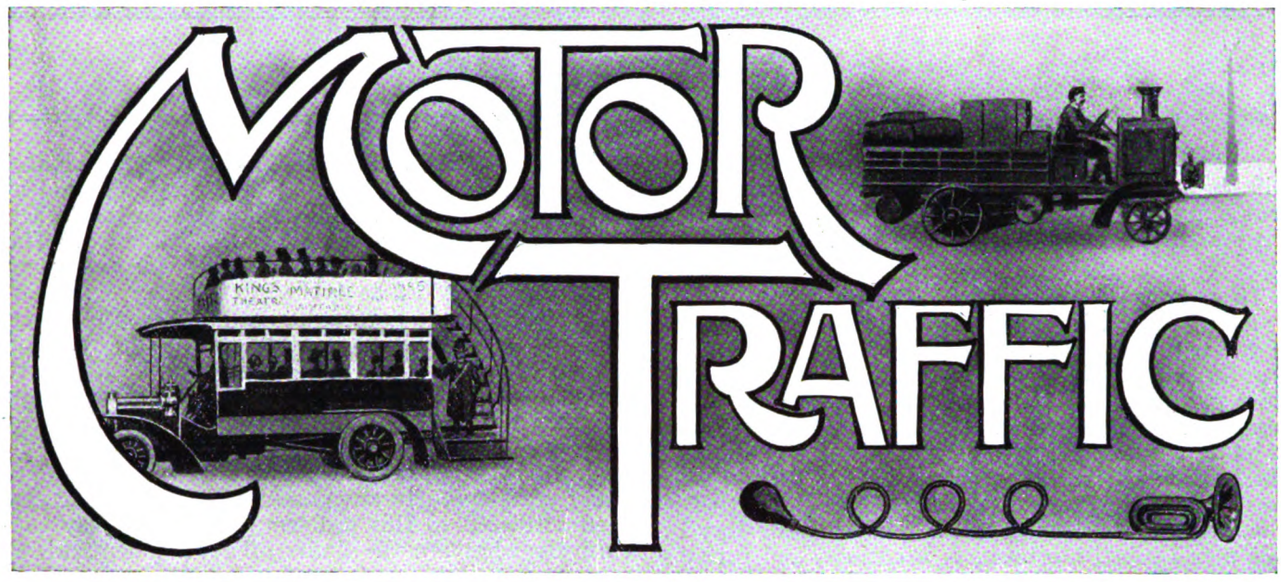

The position of motor omnibus undertakings during the war has not, on the whole, been enviable, and it says much for the inherent soundness of these enterprises and the ability with which they have been conducted that the results shown are so generally satisfactory. Until the beginning of the present year, when the increased railway fares came into force, it may be said with literal truth that the effects of the war upon motor omnibus concerns were solely adverse, and unredeemed by any incidental advantage. The conveyance under special arrangements with the Government of munition workers had in some cases considerable effect upon the figures of passengers carried, but it by no means follows that the financial return was correspondingly favourable. When the 50 per cent. addition to railway fares became operative, there was, especially in the London area, a marked rush of former railway passengers to the omnibuses. Since then, however, the petrol situation having become increasingly stringent, much of this new traffic has been lost through sheer inability to cope with it with the present depleted services due to the petrol shortage. In London, at all events, it has been a sufficiently difficult matter to adapt the services to the various fluctuations of the fuel situation, and yet to ensure the maximum possible facilities to the ordinary omnibus-riding public, and there has obviously been no margin whatever to meet any extra demands. In fact, the manner in which the London General Omnibus Company has surmounted its manifold difficulties is an outstanding example of resourceful adjustment to circumstances, and had the emergencies arising from the present upheaval been less ably met, Londoners would have suffered very gravely from inconvenience and confusion in this direction.

* * * * * *

But this record of efficiency and continued success in the face of serious difficulties is not confined to the Metropolis or to privately-owned undertakings. Taking the municipal omnibus services of Birmingham, Sheffield, and Manchester, the accounts recently published exhibit in each case very creditable results. In the case of Birmingham, there has been a considerable increase in the total of omnibus miles run and passengers carried, and nearly 25 per cent. additional vehicles have been placed in service during the twelve months under review. There is, in fact, an increase in passenger receipts from £47,865 for the twelve months ended March 31, 1916, to £62,238 for a similar period to March of the present year. The balance carried to profit and loss account, however, is slightly less than before. Thus it will be observed that the increase in receipts has not kept pace with the additional expenditure. The figures per omnibus mile, it may be remarked, show that as between 1915-16 and 1916-17 expenditure has risen from 9·706d. to 12·012d., an increase of 2·306d.; receipts, on the other hand, have gone up from 12·244d. to 14·248d.—representing a gain of 2·004d. only. The position is, of course, that on an increased scale of operations, profits are being barely maintained at the former level; but, in all the circumstances, more than this cannot reasonably be expected. The case of Sheffield is more or less analogous to that of Birmingham, but in Manchester, where operations are on a comparatively small scale, there is a drop in the net profit from £1,083 in 1915-16 to £158 12s. 11d. for the year ended March, 1917, the traffic revenue having fallen from 11·840d. per omnibus-mile to 9·677d. As against this the cost of petrol has nearly doubled, from 1·521d. per mile to 2·813d., and this, and rises in other classes of expenditure, sufficiently account for the difference.

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These figures, cursory as they are, will give some general idea as to the drawbacks under which motor omnibus enterprise must at present labour. Its burdens are assuredly heavy enough, without unfair addition, and the complaints that have recently been made as to the effect of the provisions of the Local Government (Emergency Powers) Act in imposing what virtually amounts to a double taxation for road maintenance upon motor omnibus owners are far from unreasonable. It is pointed out that, as matters now stand, proprietors are unduly mulcted, inasmuch as they must now pay substantially two separate taxes for the maintenance of roads of which, after all, they are only part-users with the rest of the traffic. The petrol tax was intended originally far less as a tax than as a levy in respect of road maintenance, and the fact that its proceeds are now devoted to the Imperial Exchequer is in itself a legitimate source of grievance on the part of those who have paid it. When, in addition, omnibus undertakings must also submit to taxation by local authorities for the self-same purpose for which the petrol tax was at the outset to serve, it will be seen that they are being asked to shoulder obligations that are both theoretically and practically unfair. The fact that these conditions are ostensibly only temporary, arising from the war, does not affect the issue. Apart from that, moreover,

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here is no guarantee that the *status quo* in this respect will be restored. The present double taxation—temporary or not—is bad, whether it be viewed from the standpoint of equity or economics.

There are very few emergencies that do not sooner or later bring their remedies, and this is certainly true of the petrol shortage. The fact that motor vehicles are now being regularly and successfully run on ordinary town gas gains in significance when one recalls that some of the earlier pre-war attempts to widen the basis of motor spirit supplies were by means of a by-product obtained in gas manufacture. That we should now be using the ultimate product itself as motor fuel is a rather curious development. The whole history of this petrol substitute business is curious, and perhaps rather characteristic of human experience in general. When motor users tried to get over the troubles of petrol shortage and restrictions by using substitutes they found themselves in some trouble as to the legal status of such. The legal difficulty settled, another arose, and substitutes also came under control and restrictions. Of this latter action the effect was not perhaps quite what the authorities intended. It drove the "substitute" off the market, and increased the demand—within the scope of the official allowances—for petrol.

* * * * * *

The use of gas as a substitute is yet in its very early stages, but the essential fact is that by its use vehicles that would otherwise have been standing idle are out on the road again, and the chars-a-banc owners find some possibility of being able to carry on business after all this season. It could be available for use for other vehicles should the "worst come to the worst." It is scarcely conceivable that any prohibitions or restrictions are likely to be deliberately imposed on the development by motor users of this new resource to its full extent. The obstacles that already exist are, perhaps, in themselves sufficiently formidable, concerning, as they do, the lack of labour and materials for the necessary equipment. Apart from these difficulties, there are no others of serious relative importance. The cost of adaptation in a way which, if rough and ready, amply suffices, is about £20, and the result is to make available a perfectly satisfactory motor fuel, the cost of which is equivalent to petrol at something like 11d. per gallon. No alteration to the engine is required, and the gas can be readily interchanged with petrol if necessary. Admittedly there are some disadvantages to be faced; the flexible baloon-like containers increase wind resistance, and do not add to the appearance of the vehicle, but, as already remarked, matters such as these are not of great comparative moment. Some loss of power is shown as compared with petrol, this amounting to about 15 per cent. Consequently, there would be some little reduction of hill-climbing capacity, but experience has already shown that this is not very important. On most of the routes already being covered the physical conditions are not by any means of the most favourable character. On the contrary, they may be described as being of more than average severity. Whatever may be said as to the small scale and makeshift character of these experiments, the facts remain that a daily chars-a-banc service from London to Eastbourne and back is being maintained by this means; that the Bath Tramways have adopted this expedient on one or two of the routes covered by their vehicles, and that Walsall Corporation and others have decided to make essays in this direction. This is sufficient testimony to, at all events, the emergency value of coal gas fuel as applied to internal combustion road vehicles. As regards its possible future utility, it would be difficult to venture any prophecy. But the expedient of using high pressure instead of low, and thus of substituting more compact rigid containers for the flexible "balloons" now carried obviously suggests itself. Compressed gas was used for the engines on the cars of Blackpool and Lytham Tramways many years ago. In any case, inventive effort having been attracted to this problem, no one can say conclusively what are the limits of development arising therefrom.

THE MOTOR TRANSPORT YEAR BOOK.*

We have received the second annual volume of this useful publication. In arrangement and style of get-up it bears a close resemblance to its older, better known, and much bulkier companion, "Garcke's Manual of Electrical Undertakings," which has proved a boon and a blessing to the industries concerned for many years. The book is designed to meet the need for a financial and descriptive record. It contains information relating to 374 companies and corporations authorised to engage in motor transport business in Great Britain. In the first volume the number was 350. There has also been an increase from 300 to 314 in the number of manufacturing firms dealt with. These increases are not so much indications of growth within the industry as of the greater availability of information about existing undertakings. Indeed, in the circumstances arising out of the present war, no great growth in the industry can be looked for, but after the war the development should be all the more rapid.

The book opens with an introduction and general survey in a series of valuable articles. Then follow the sections containing the records and data as to, first, motor transport undertakings, and second, manufacturing concerns. A geographical index gives the names of the undertakings according to the districts served, no fewer than 669 districts being named as compared with 560 last year. Finally we have the directory containing the names and addresses of over 2,000 directors and officials. Thus we have a comprehensive, well-thought-out plan executed in the way which might be expected from the Electrical Press.

A few interesting aggregate figures may be quoted. The issued capital of the undertakings included in Section 1, including expenditure by private concerns and by corporations on motor omnibus account, is over £11,620,000, as compared with £7,500,000 last year. The number of vehicles is 9,320, as compared with 6,300. The issued capital of the manufacturing firms is £32,220,000.

Among the articles in the volume is "Public Service Motor Policy in 1917," which discusses difficulties surrounding the immediate outlook. The law relating to motor omnibus services, the constitution and powers of the Road Board, and war-time restrictions in connection with lights on vehicles, are other subjects dealt with.

It may be noted in conclusion that railless trolley undertakings are included in the book, and that all concerned in passenger transportation by means of motor vehicles on roads will find the volume exceedingly useful.

YORK ELECTRIC OMNIBUSES.—In their report for the year ended March 31 the Tramways Committee state that the omnibuses ran 77,059 miles, carrying 642,943 passengers. The receipts were £2,571 19s. and the receipts per mile 8·01d. During the year the charge for electricity amounted to £737, whereas if the vehicles had been operated by petrol the cost would have been over £1,000. In wet weather, at week-ends, and at times of rush traffic some disadvantage has been found by intended passengers having to be left behind owing to the limited carrying capacity of the omnibuses, particularly in the case of the Burton Stone Lane traffic. The Tramways Committee have recommended the purchase of an additional omnibus.

* The Motor Transport Year Book and Directory, including public service undertakings and allied manufacturing companies, and a directory of officials connected therewith. Vol. II., 1917. 10s. 6d. net. London: Electrical Press, Limited, 13-16, Fisher Street, Southampton Row, W.C.

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ARMY MOTOR SPECIFICATIONS OF THE UNITED STATES.*

PLANS THAT WILL ENABLE MAKERS TO CHANGE RAPIDLY FROM COMMERCIAL TO MILITARY MODELS.

SPECIFICATION FOR 1½-TON VEHICLES.

144. *Lighting Equipment.*—The truck shall be provided with the following lighting equipment :—

One searchlight, with quick-acting vertical and horizontal adjustment, silver-plated brass or copper parabolic reflector, or glass parabolic reflector silvered on the back, with 21-c.p. tungsten focussing bulb.

Two side lamps, combination oil and electric, with 8-c.p. 6-8 volt tungsten bulbs.

One electric instrument lamp, with 2-c.p. 4-volt bulb, and one combination oil and electric tail lamp with 2-c.p. bulb, connected in series.

One portable trouble lamp, 8-c.p., with cord, and plug with separate socket.

One ammeter of best make, for indicating the charge and discharge of battery.

145. *Searchlight.*—The searchlight shall be not less than 10½ in. in diameter outside of front flange. The body of lamp shall be spun or pressed from one piece of heavy brass, copper, or steel. In the design of the lamp no parts shall be used which are liable to shake loose from vibration. The reflector shall be parabolic in form, spun or pressed from brass or copper of suitable thickness, and heavily silver-plated. The reflector may be of glass, silvered on the back. The searchlight shall be of dustproof construction.

146. The searchlight shall be provided with a suitable handle, and means for clamping the searchlight securely in any desired position. The searchlight shall be installed on the chassis in a location permitting it to be readily operated from the driver's seat, and also in such a position as to be unobstructed from the front.

147. This lamp shall be provided with a single point bayonet socket, with two wire connections, and a suitable focussing device.

148. *Side Lamps.*—The two side lamps shall be best quality combination oil and electric, of suitable design and construction, and fitted with standard S.A.E. single point, grounded return sockets, and 15-c.p. 6-8 volt tungsten bulbs. The oil fonts shall be so designed that they cannot rattle or drop out. These lamps shall be made of heavy gauge sheet steel or brass, thoroughly rivetted and soldered, fully black enamelled, and fitted with forged steel yoke brackets or installed in dash. They shall have large glass semaphore front lens.

149. The instrument light socket shall be the single point type, with two terminals for wires. One terminal will connect with source of current supply, and the other will connect with a wire leading to the one point grounded tail light socket, thus putting the instrument light and tail light in series.

150. *Tail Lamp.*—The tail lamp shall be the same as specified for side lamps, except that the large semaphore lens shall be of red glass coloured in the glass composition, and the side glass may be omitted. The bulb shall be 2-c.p. 4 volt, connected in series with bulb of the same size and rating in instrument lamp. The tail lamp bracket shall be made of forged steel, and shall be located in such a position as to prevent it from being knocked off due to collision, or to the rear wheels of truck dropping into deep ditches.

151. *Trouble Lamp.*—The portable trouble lamp shall consist of a suitable hardwood handle through which the cord shall pass, and provided with an S.A.E. standard, single contact socket, with two connections for wires, a lamp guard of proper design, and an 8-c.p. 6-8 volt tungsten bulb. The other end of cord shall be provided with a suitable single point combination plug for connecting with a ground return socket. The cord shall be No. 14 B & S gauge, flexible, twin-conductor, rubber covered, double braided, packing house cord of best make. The portable trouble lamp shall be provided with an S.A.E. standard, single point, flush type, flanged socket, installed in a readily-accessible location, preferably on the dash, and connected with the lighting switch.

152. *Ammeter.*—Furnish and instal in a suitable location a flush type ammeter of best make, having a double scale for indicating the charge and discharge current of battery, and provided with a black dial bearing white figures. It shall be installed in such a location as will permit it to be readily observed from the driver's seat, and properly illuminated by the instrument light.

153. This ammeter shall be connected in the circuit leading from the negative terminal of battery. The ammeter must be so designed as to not be affected by severe vibration. It must have a light moving system, and be dead beat in action. It must be thoroughly insulated, and be so designed as to avoid short circuits due to the loosening of parts.

* *Continued from p. 397.*

154. *Extra Lamp Bulbs.*—The following extra lamp bulbs shall be provided, installed in a suitable metal case :—

Two 21-c.p. 6-8 volt tungsten bulbs of best make, with single point Ediswan bases.

Four 8-c.p. 6-8 volt tungsten bulbs of best make, with single point Ediswan bases.

Two 2-c.p. 4 volt tungsten bulbs of best make, with single point Ediswan bases.

155. The bulb case shall be of heavy seamless steel, with a heavy seamless steel hinged cover with automatic spring catch. The bulbs shall be held securely in place by means of brass springs and a suitable locking device. The case must be of proper size to hold the above lamps without the lamps touching each other or the sides, top, or bottom of the case. The case shall be thoroughly coated, both inside and outside, with best quality black enamel.

156. *Wiring.*—The trucks shall be wired with the system of installation known as the ground-return system. In this system of wiring the chassis frame or bare metal is used as the return circuit. All ignition wiring must be protected from water and oil, and mounted in such a manner as to prevent chafing.

157. All wiring and electrical equipment shall be constructed, installed, and tested, in accordance with S.A.E. recommended practice.

158. *Conduit.*—Whenever practicable the wires shall be carried in either rigid or flexible metallic conduit. The flexible conduit is preferred. The conduit shall be securely fastened by means of galvanised straps and galvanised machine screws of proper size. The ends of the conduit must point downward, so that water will not run into the conduit.

159. *Cleats.*—Where wires are not protected with conduit they shall be securely cleated at intervals of not more than 10 inches. Such cleats shall be of galvanised steel of proper thickness and width, and secured with suitable screws. Galvanised steel machine screws in tapped holes shall be used in all cases where the fastening is to be made on metal.

160. *Fuse Box.*—A four-circuit fuse box of proper design shall be installed in a readily-accessible location.

161. The fuse box shall be of best make, and constructed of moulded insulating material in both box and cover, or the box and cover may be of black enamelled steel suitably lined with a proper insulating material. The wires shall all enter the fuse box from below, and be a snug fit in the opening in box. If steel boxes are used the holes in the box where wires enter shall have suitable insulating bushings, and the fuse clips must be mounted on a base of suitable insulating material, securely fastened to back of box by suitable brass screws. The heads of screws shall be deeply countersunk below the surface of the base.

162. *Extra Fuses.*—One complete set of extra fuses will be provided and attached by means of suitable spring clips to the inside of fuse box cover.

163. *Circuit Breaker.*—If a circuit breaker of an approved type is installed, the fuses herein specified will not be required.

164. *Switches.*—The ignition switch shall be a triple-point switch of best make, with one point for battery ignition, one point for magneto ignition, and the other point for cutting out the high-tension magneto by grounding.

165. The lighting switches shall be the push or pull type of flush switch of best make, mounted in a location readily reached from the driver's seat, and provided with a heavy brass gang switch-plate, in dead black finish.

166. *Grounding.*—Whenever an insulated conductor is connected to "ground," the connection shall be installed so as to be readily accessible and removable on the completed truck. In all cases where the connection is made to an iron or steel part, the iron or steel shall be thoroughly tinned at the point where the connection is made, and the ground connection shall be firmly maintained by means of screws or bolts with suitable lock washers. Brass or copper lugs of proper size shall be used for all ground connections. The lugs shall be properly soldered to the ends of cables.

167. All cables shall be continuous from connection to connection. The splicing of cables will not be permitted. All cables shall be provided with suitable lugs or terminals wherever practicable. Where

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the use of terminals is not practicable, the ends of cables shall be tightly twisted, formed into a solid loop of proper size for the screw connection, and the loop thoroughly soldered.

168. *Battery.*—Furnish and instal on the truck a 100-ampere hour, 3-cell lead acid battery of best make, for ignition and lighting only, or a 75-ampere hour, 5-cell, nickel-steel, alkali battery of best make, at the option of the Government.

169. The battery shall be installed in a heavy pressed steel case, with waterproof hinged cover with latch. The inside of case must be 6½ in. wide, 16¾ in. long, and 9⅝ in. high.

170. *Battery Terminals.*—The battery terminals and connections must be so arranged as to prevent the possibility of the battery connections being reversed in relation to the generator terminals.

171. *Spark Plugs.*—The spark plugs shall be constructed in accordance with the latest recommendations of the Society of Automotive Engineers, and the large hexagon type of shell provided with a single sparking point shall be used. The spark-plug threads shall be ⅞ in., 18 threads to the inch.

172. The plug must be provided with a porcelain of best make, packed with suitable copper gaskets and held in place with proper bushings.

173. The centre electrode shall be made of metal which will not readily corrode, warp, or be burned by the hot gases, and must be packed thoroughly gas-tight inside of the porcelain.

174. The ends of the high-tension cable at spark plugs must be provided with suitable terminal properly secured to the cable and spark-plug terminals.

175. The seat for spark-plug gaskets shall be finished to a smooth and plain surface, and the seat shall be at right angles to the centre line of spark plug.

Frame and Body.

176. *Frame.*—The frame shall be constructed of pressed steel or standard rolled structural sections. The frame and suspension must be so designed as to prevent cramping of any part, due to distortion of frame because of uneven road condition.

177. The distance from the back of the driver's seat to the rear end of frame shall be 10 feet. This frame length will permit of sufficient overhang of body to allow the installation of towing hooks and rear bumpers.

178. The frame shall be reinforced at proper intervals with suitable cross members thoroughly fastened to the frame with hot rivets or fitted bolts rivetted over nuts. All holes in the frame shall be drilled, not punched. A suitable towing hook shall be attached to each side of the front end of frame. These towing hooks may be installed on the front bumper.

179. The frame shall be provided with two best quality dressed oak sills, one bolted on top of each frame side member. These sills shall be the same width as the flange on frame, and shall be of proper depth to give not less than five inches clearance between the rear tires and the side sill of body, as shown on drawing Q.M.G.O. T-105. These sills shall be gained over all gusset plates or other irregularities on the frame, and shall be provided with not less than ten sets of body sill fastenings, as shown on drawing Q.M.G.O. T-107, and two angle plates with bolts, as shown on drawing of body. The sills shall be painted with three coats of paint of the composition given on drawing.

180. *Front Bumper.*—A spring type of front bumper of suitable design and construction shall be provided, and properly bolted to the front of frame. This bumper must be so arranged as to not interfere with the starting crank. Front towing hooks shall be provided, one at each side of the frame. These towing hooks may be fastened to the front bumper, if arranged in an approved manner. No part of the bumper extending in front of the radiator shall be integral with the chassis frame.

181. *Rear Bumper.*—A rear bumper shall be provided, as shown in detail on drawing T-102.

182. *Radiator Protectors.*—Each truck shall be provided with an effective radiator protector, which shall extend the full height and width of the radiator. This radiator protector shall be constructed of heavy structural steel shapes or steel castings, and shall be firmly bolted to the chassis frame. It must be so installed as to not interfere with the starting crank. Complete detail drawings, showing the construction of this protector, must be submitted.

183. *Steering Gear and Wheels.*—The steering gear may be either the worm and wheel type or the screw and nut type, and means shall be provided for its thorough lubrication. Adjustments must be possible without removing the steering assembly from the frame.

184. A notched grip moisture-proof steering wheel of best quality shall be provided, having an outside diameter of not less than twenty inches. The steering post must be rigidly mounted to prevent vibration, and must be provided with both spark advance and throttle levers.

185. The gear reduction and length of levers on steering gear must be such as to give easy turning action with the fully loaded truck, but the gear reduction must not be so low as to prevent sufficiently quick turning of the wheels in steering.

186. The ratio of movement between the steering hand wheel and the front road wheels shall be such that for 360 degrees travel of the steering wheel the road wheels will move not more than 40 degrees, and not less than 30 degrees about the steering angle pivot for two-wheel steer.

187. Throughout the steering gear, including all steering connection joints, adequate provision must be made for lubrication.

188. *Steering Connections.*—The steering knuckle tie rod, steering knuckle arms, and steering gear connecting rod must be located back of the axle in order that the front axle may protect them against damage from obstructions. The steering knuckle tie rod must be straight from end to end, and located as far above the lower edge of axle as possible, and entirely protected by the axle from spring seat to spring seat.

189. All steering connecting rod joints shall be hardened steel sockets, held by springs in close contact with hardened steel balls. The steering cross rod joints may be of the ball and socket or clevis type.

190. *Location of Control.*—The gear shift and hand brake levers must be placed at the driver's right, with the hand brake lever to the right of the gear shift lever. The hand brake lever is to be pulled back for brake application. The gear shift lever must be fitted with a latch guarding the reverse position.

191. *Gearshift Lever Handle Positions.*—The gearshift lever handle positions shall be as follows :—

First speed	...	Forward and left.
Second speed	...	Rear and left.
Third speed	...	Forward and right.
Fourth speed	...	Rear and right.
Reverse	...	Guarded by a latch in separate gate. Extreme left through neutral, then forward.

192. *Clutch and Brake Pedal.*—The clutch pedal should be located to the left, and the foot brake pedal to the right of the fore and aft centre line of the steering column.

193. *Accelerator Pedal.*—The accelerator pedal shall be placed to the right of the brake.

194. *Spark and Throttle Hand Levers.*—The spark and throttle hand levers shall be located to the right of the fore and aft centre line of the steering column. The spark lever shall be the shorter of the two, and both levers carried on stationary sectors. The words "Spark" and "Throttle" are to be clearly marked on the levers. Both levers shall be arranged so that they are pushed forward to advance the spark and to open the throttle.

195. The spark and throttle sectors shall be marked to indicate the open and closed positions of throttle, and advance, retard, and battery starting positions of spark.

196. *Data Plate.*—A suitable data plate must be installed in a readily observable location. The data on the plate must include the following :—

Normal load capacity, pounds	...	...	3,000
Maximum speed, miles per hour	...	...	15
Serial number of motor	...	...	...
Serial number of chassis	...	...	...

197. *Seat and Top.*—The trucks will be provided with seat and top shown on drawing Q.M.G.O. No. T-106.

198. *Fenders.*—The trucks must be provided with front fenders only. These fenders must be of suitable design and rigid in construction.

199. *Bodies.*—Bodies are not to be furnished unless specifically called for. The construction of chassis shall be such as to permit the proper installation of body on same, having inside dimensions of 5 ft. 1 in. wide, 10 ft. long, and 2 ft. high, with the floor of body at a height of not over 45 in. above the ground when the truck is loaded. The length of frame back of driver's seat shall be 10 ft.

200. In fastening the body to chassis, neither the frame nor the frame members shall be drilled, except the fastening for angle plate shown on drawing Q.M.G.O. No. T-105. The body shall be fastened to the frame by means of suitable bolts, as shown on drawing T-107.

201. *Painting.*—The entire chassis shall be first thoroughly cleaned of all dirt, grease, or oil, and covered with a coat of best quality rust-resisting paint. It shall then be painted with three coats of best quality lead and oil, olive drab colour, of the following composition :—

6 lb. white lead ground in linseed oil.
1 lb. raw umber.
1 pint turpentine.
½ pint japan drier.
1 quart linseed oil.

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202. Each coat must be permitted to become thoroughly dry before applying the next coat.

TRANSMISSION AND RUNNING GEAR.

203. *Clutch.*—The clutch may be either dry multiple disc or dry single disc type, having one series of plates faced with wire asbestos friction material. It must be of suitable design for transmitting the maximum torque of the engine without slipping, must be easily accessible for repair or replacement of parts, and must be provided with a suitable arrangement for permitting easy engagement which will not require frequent adjustment or renewal of friction material.

204. Flanges must be fitted on the clutch pedal in order to prevent the driver's feet from slipping off same. The pressure on the clutch pedal pad necessary to disengage the clutch must be not more than 90 pounds nor less than 70 pounds.

205. The clutch must be readily adjustable or provided with a spring which will give uniform action of the clutch during the wearing life of the friction material.

206. The clutch must be readily removable without disturbing the transmission, steering gear, motor, or other important parts, and must be provided with an effective clutch brake.

207. The clutch must be completely enclosed in order to prevent the entrance of dust, oil, or water.

208. The steel clutch discs must be properly hardened, and those without ring friction facing to be ground to a smooth surface.

209. All thrusts must be self-contained when the clutch is engaged.

210. The clutch release must be fitted with ball bearings, with adequate provision for lubrication. Plain clutch thrust bearings will not be acceptable.

211. *Transmission Drive Shaft.*—The transmission drive shaft, connecting clutch with transmission, must be provided with two universal joints of the lubricated bearing type. The fabric type of joint will not be acceptable. The joints must be entirely enclosed, and means provided for suitable lubrication and for retaining the lubricant in the joint. Provision must be made to prevent the shaft, whipping loose in the event of joint failure.

212. *Transmission.*—The transmission shall be of the selective sliding gear type, and must have not less than four speeds forward and one reverse, and must be installed as a separate unit on a subframe between the engine and differential. It must be installed with a three-point mounting in order to prevent the distortion of frame from breaking the transmission legs. The high-speed gear shall be direct without reduction in the transmission unless the truck is four-wheel drive.

213. The gears of transmission must be cut on suitable gear shapers or gear generating machine, from forged steel blanks of alloy steel equal to S.A.E. specification Nos. 2320, 3120, or 3320, properly case-hardened and accurately assembled to a quiet running fit under load. These gears must have sufficient width of face and strength to transmit the full power of the engine at all gear ratios, with a proper factor of safety.

214. The splined driving shaft for sliding gears must be made of best quality alloy steel, properly heat-treated.

215. The low gear ratio of transmission shall be suitable for giving a tractive factor of not less than ·338, as required by paragraph 30, and the total low gear reduction of transmission and final drive shall be not less than 40 to 1.

216. The transmission case must be oil-tight, and must be provided with a filler plug on the top or side, a suitable drain plug on the bottom, and an oil level plug on the side of case.

217. The main drive shaft, and also the countershaft of transmission, must all be provided with ball or roller bearings of best make and suitable capacity. The use of plain bearings in the transmission assembly will not be permitted, except in the case of the reverse gear. If the bearings are adjustable, the adjustment must be accomplished by the use of shims.

218. The transmission must be accessible from below the body for inspection, adjustment, removal, or repair. Transmission gears constructed as an integral part of the rear axle, or in any other manner which does not provide proper spring suspension, will not be acceptable.

219. *Propeller Shaft.*—The propeller shaft connecting the transmission with the rear axle and differential must be of suitable size and strength to properly transmit the full power of the engine at all gear ratios, under the most severe service conditions. It must also be of such design, and must be supported in such a manner, as to prevent whipping or excessive vibration at all reasonable coasting speeds. The slip joint shall be fitted with an S.A.E. standard or similar spline connection.

220. *Slip Joint.*—The slip joint for lower end of propeller shaft must be provided with S.A.E. standard splines, and must be designed in such a manner as to prevent the formation of a shoulder on the inside of joint. This slip joint must also be provided with a suitable tight-fitting leather boot which will prevent the entrance of dust or water.

221. Suitable provision must be made for preventing the propeller shaft from whipping loose in case of failure of the front universal joint.

222. Two universal joints must be provided between the transmission and differential. These universal joints must be so designed as to contain a proper quantity of lubricating grease, and must each be provided with a tight leather boot of best quality, first cut leather. The use of fabric universal joints will not be permitted.

223. The leather boots specified must be provided irrespective of the type of universal joint which is employed, and must be provided at each end of boot with suitable screw clamps.

224. *Drive Axle.*—The trucks may be either internal gear drive, chain drive, worm gear drive, or double reduction gear in a central housing. The driving axle may be either full-floating or semi-floating type.

225. The design, material, and construction of the drive axle and final drive shall be in every respect in accordance with the best standard practice.

226. *Driving Axle Bearings.*—The driving axle must be provided with suitable solid steel taper roller or two-point ball bearings of best make. All bearings must be provided with suitable means for lubrication and for retaining the lubricant in the bearings. All thrusts must be compensated for by adjustable ball or roller bearings. The plain type of thrust bearing or three-point ball bearings will not be permitted.

227. The rear axle housing must be oil-tight, and must have an inspection plate giving ready access to the inside of housing. An oil filler plug must be provided at a proper height to act as an overflow in filling. If the oil filler plug is located in the inspection plate, the studs for holding the plate must be so arranged as to prevent the plate from being reversed. The differential complete must be readily removable after removing the splined drive shafts.

228. [Omitted for reason stated on page 393, June 9, 1917.]

229. *Differential.*—The differential shall be of such a type as to automatically permit the wheels to revolve at different speeds without complete loss of torque on either wheel, and also to apply at least normal torque to whichever wheel shall have traction. These requirements shall be met when the vehicle is running either forward or backward.

230. It shall consist of a forged steel or cast steel case, to which the large gear is attached by being bolted or rivetted. This case shall also contain the necessary gears for producing the required differential action, and shall be provided with suitable steel roller or ball bearings of best make. The case shall be supported on its bearings independent of the drive shaft ends. The drive shaft ends shall be properly fitted and connected by means of suitable splines to the gears in differential case. The spline connection shall be made in accordance with S.A.E. standards.

231. All steel differential or driving gears shall be machine cut on suitable gear generators, from forged blanks of S.A.E. steel Nos. 2320, 3120, or equal, and properly heat-treated.

232. The bevel drive pinion shall be forged integral with its shaft. This shaft shall be made of steel equal to S.A.E. specification No. X3335, properly heat-treated, and provided with two sets of taper roller or ball bearings of best make, and provided with suitable means for the ready adjustment of the bevel driving pinion in relation to the large driven gear, and *vice versa*. If ball bearings are used, suitable means shall be provided to take care of thrust loads.

233. *Worm or Bevel Gear Drive.*—If the rear axle is of the worm or bevel gear driven type, it may be a built-up structure using steel tubes pressed or shrunk into a properly ribbed cast-steel or malleable iron housing, or a suitable one-piece cast-steel or malleable iron axle housing may be used without any steel tubes. Truss rods may be used at the discretion of the constructor, but the factor of safety of the rear axle load carrying assembly or member must be large enough to preclude any likelihood of breakage under the most severe service conditions.

234. *Internal Gear Drive.*—If the final drive is an internal gear, provision must be made for entirely enclosing the driving gears, and for retaining the lubricating oil or grease, and for preventing same from getting on to the brake bands.

235. Both the spur driving pinion and the internal gear shall be machine cut from drop forged steel blanks. The internal gear ring may be made of carbon steel equal to S.A.E. specification No. 1020, properly heat-treated for the purpose, but the spur driving pinion

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must be made of steel equal to S.A.E. specification Nos. 2320, 3120, or 3320, suitably case-hardened. Both gears must have wide faces and must be so designed and constructed as to readily withstand the maximum power of the engine under the most severe service conditions, with a proper factor of safety.

236. All gears connected with this drive must be heat-treated in the most suitable manner. The internal gear must be pressed on to turned flange on the wheel hub, and then firmly secured with suitable rivets.

237. The jack shafts shall be made of best quality chromium-nickel steel equal to S.A.E. specifications Nos. 3140 or X3325, must be properly splined at each end for connecting with driving gear and differential, and shall be provided at each end with steel roller or annular ball bearings of best quality. These jack shafts shall be enclosed in steel tubing having flexible end connections in both the differential housing and the internal gear case, and these flexible connections shall be provided with suitable felt washers.

238. The wheel spindles shall be made of best quality chromium-vanadium steel equal to S.A.E. specification, No. 6135, properly heat-treated.

239. *Front Axle.*—The front axle shall be of I-beam section, drop forged from a single piece of carbon steel or alloy steel equal to S.A.E. steel No. 1035, and properly heat-treated. The steering knuckles and the steering knuckle levers shall be drop forged from alloy steel equal to S.A.E. steel Nos. 2330, 3130, or 3325, and properly heat-treated. The wheel spindles shall be provided with steel roller bearings of best quality, and provided with proper means of lubrication. The wheel hubs and bearings of both front and rear axles must be so designed as to prevent the entrance of water, dust, or dirt, and also must prevent the leakage of grease from the hubs.

240. *Brakes.*—Two independent sets of double-acting brakes shall be provided. The emergency brake must act directly on the rear wheels, and be operated by a hand lever with ratchet. Service brakes may act directly on the rear wheels or on the drive shaft, and must be operated by a pedal. Brakes must be lined with an approved friction material, and must be so constructed that they may be readily adjusted and securely locked in adjustment without removing the wheels or other parts.

241. Suitable flanges must be fitted on the brake pedal to prevent the driver's foot from slipping off same.

242. Brake rods are to be sufficiently stiff or so supported as to prevent whipping or rattling.

243. Brakes must be sufficiently powerful either to slip the wheels or stop the truck within a distance of not more than fifty feet, with either the service brakes or the emergency brakes, when the normally loaded truck is running on a level, hard, and dry macadam road at a speed of 15 miles per hour.

244. The service brakes may act directly on the drive wheel, brake drums, or on the driving axle next to the propeller shaft.

245. Brake adjustments must be readily accessible, and must be adjustable without the use of special tools. All brake clevises, pins, or other bearings in brake rods or brake connection must be provided with bronze bushings.

246. The design of brakes and brake connections must be such that the application of drive wheel brakes is not affected by relative movement between the frame and axle.

247. Both the service brakes and the emergency brakes must be readily adjustable for taking up wear, and must be provided with as large an amount of radiating surface as practicable. Provision must also be made for holding the braking surfaces on brake bands or brake shoes concentric with the brake drum surface. The brakes must be so designed as to release completely and not drag at any point when the brake lever or pedal is released. The brake drums must be exactly circular, and the central opening in same fitted over a finished boss on the wheel hub, or other method equally effective which will retain the brake drum must be fastened to the wheel with suitable tight-fitting bolts. Provision must also be made for preventing oil or grease from leaking out of the axle or drive shaft ends and getting on to the brake bands and drums.

248. All brakes must be mounted in such a manner that the braking strains will be taken by parts which are strong enough to withstand these strains under the most severe braking conditions.

249. *Wheels.*—The wheels shall be of suitable size for the use of 36-in. S.A.E. demountable solid tires, and shall be best quality cast-steel wheels, of proper design, strength, and construction, and made in accordance with the best standard practice.

250. The wheels shall be of suitable size and design for the use of 36-in. × 4-in. single solid S.A.E. demountable rubber tires on front wheels, and 36-in. × 7-in. single solid S.A.E. demountable tires on rear wheels. All wheels shall be of proper strength to resist the vertical and lateral loads in the most severe service, and with the maximum load and speeds for which the truck was constructed.

251. The hubs of wheels shall be made of best quality cast or forged steel, free from blow holes which will impair the strength or finish of finished hub, and must be provided with best quality hardened and ground roller or annular ball bearings of proper size. The hubs may be integral with the wheel casting.

252. *Demountable Tire Fastenings.*—The steel fastenings for demountable tires shall be constructed in accordance with drawing Q.M.G.O. No. T-101. Trucks will positively not be accepted having tires or tire fastenings which differ from those herein specified.

253. *Tires.*—On two-wheel drive trucks the tires shall be 36-in. by 7-in. single tires on rear wheels, and 36-in. × 4-in. single tires on front wheels, both front and rear tires demountable.

254. On four-wheel drive trucks the tires shall be 36-in. × 6-in. single, demountable, both front and rear.

255. All tires shall be best quality solid rubber tires on hard rubber base, with S.A.E. steel rims. A sample section of the rubber tire and rim must be submitted with each proposal.

256. Complete detail and assembly drawings, showing the construction, material, and dimensions of all parts of the wheels must be submitted.

257. *Hub Odometer.*—A hub odometer of best make, and of suitable design and construction for most satisfactory use on motor trucks, shall be provided and installed on one of the front wheels. This odometer shall have not less than five figures in the dial, and provision shall be made to prevent leakage of grease into mechanism.

Springs.

258. *Springs.*—The chassis spring suspension must be of such design and construction as to relieve the body and chassis above springs of excessive vibration when the vehicle is travelling empty or partially loaded over rough surfaces at maximum speed.

259. Springs must be made of alloy steel, heat-treated to develop the following physical properties :—

Minimum elastic limit ...	170,000 lb. per square inch
Tensile strength, not less than	210,000 lb. per square inch
Elongation, not less than	5 per cent. in 8 in.
Brinell hardness	390–470

Care must be exercised to prevent specimen from slipping in the grips and causing diagonal strains.

260. *Deflection of Springs.*—The deflection of rear springs shall be not more than 1,000 pounds per inch, and not less than 800 pounds per inch. The deflection of front springs shall be not more than 800 and not less than 550 pounds per inch. The maximum deflection permitted by the permanent stops, both front and rear, must be given.

261. Spring eyes must be provided with phosphor-bronze or soft steel bushings, pressed in and reamed in position to the S.A.E. limits of tolerance for such bushings. Bushings must have suitable lubricating channels, and conform to S.A.E. standard of wall thickness. If phosphor-bronze is used, it must be equal to S.A.E. specification No. 26.

262. Spring eye bolts must be hardened and ground to S.A.E. standard sizes and tolerances. Eye bolts must be securely anchored to prevent turning in the spring shackles, and be provided with suitable means for lubrication.

263. Spring shackle bolts or cross-bars must be properly hardened and ground on bearing surfaces, and be so designed as to provide at least equal projected bearing area to that provided by the eye bolts. Where shackle bolts are used in connection with bat shackles, they must be provided with suitable means of lubrication and be securely anchored to prevent turning in the shackle. The spring shackle bolts shall also be made to S.A.E. sizes and tolerances.

263a. *Spring Shackles.*—Spring shackles must be made of a material equal to S.A.E. specification No. 1235 for steel castings, and heat-treated. They must have a centre-to-centre distance not less than the spring width, and may be of two types—bar shackles formed of two plates with a connecting bar formed integral with them, or yoke shackles, having one end open and the other end connected and adapted to receive the shackle pin or bar. Where yoke shackles are used, they must be bushed at the shackle pin or bar end with a material equal to S.A.E. specification No. 26, or soft steel, bushing to have $\frac{1}{8}$-in. walls, lubricating channels, and suitable means of lubrication. Yoke shackles must be so designed as to provide projected bearing area at the closed end at least equal to that of the spring eyes. Rear spring shackles must be in tension. Spring shackles or hangers must be so constructed as to prevent binding on the sides of the spring eyes or the supporting brackets.

264. *Shackle Hangers.*—Shackle hangers, when used in connection with bar shackles, must be bushed with a material equal to S.A.E. specification No. 26 or soft steel, said bushings to have $\frac{1}{8}$-in. walls, and be provided with suitable lubricating channels and means of lubrication.

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265. *Shackle Position.*—In the design of springs and the assembly of same on chassis, the spring shackles must stand in approximately a vertical position when the spring is under full load, except on chain-driven vehicles, where shackles must stand at an angle sufficient to allow chain adjustment without cramping the spring main plates.

266. *Spring Leaves.*—Spring leaves must be held against longitudinal movement by means of an alloy steel centre bolt of proper size, by an indentation in the centre of each leaf, or by a combination of those methods. If centre bolts are used, the head shall conform to S.A.E. standard, and be provided with snug fitting S.A.E. standard centre bolt nuts and means provided for locking the nuts in position. Springs with shrunk-on centre bands will not be acceptable because of the difficulty of making repairs in field service. Centre fastening must be shown in detail on the drawing.

267. *Spring Clips.*—Spring clips must be made of alloy steel equal to S.A.E. No. 3130 or 3320, properly heat-treated, to develop physical properties equal to the following :—

Elastic limit	100,000 lb. per square inch
Tensile strength	130,000 lb. per square inch
Elongation	20 per cent. in 8 in.
Reduction of area	60 per cent. in 8 in.
Brinell hardness	295
Scleroscope	35

268. Spring clips must be constructed in accordance with S.A.E. standards. The chemical specifications, physical properties, and heat treatment must be given. The use of carbon steel spring clips will not be permitted. Nuts may be of carbon steel.

269. *Metal Spring Chairs.*—Metal spring chairs must be provided between springs and spring seats. Chairs must be so designed as to be held by the spring clips against longitudinal movement, and have one face shaped to conform to the shape of the spring when the spring is free or without load. The centre of the chair must be recessed to properly receive the centre fastening of the spring. Spring chairs may be omitted where the spring seat is shaped to conform to the shape of the spring when the spring is free.

270. *Pressure Blocks.*—Pressure blocks, of a material equal to S.A.E. specification No. 1235 for steel castings, heat-treated, must be provided between the spring clips and the spring, and must be grooved and conform to the shape of the spring clips where in contact with the clips. The face of pressure blocks must conform to the shape of the spring when the spring is free.

271. *Permanent Stops.*—All vehicles must be provided with permanent stops which will prevent the springs from being deflected to a point at which the stress will be greater than 75 per cent. of the elastic limit of the material from which the springs are made. Suitable rubber or steel buffers must also be provided for both front and rear springs.

272. *Rebound Clip.*—A suitable number of rebound clips must be provided on each spring, and attached in such manner as to retain their proper position. These rebound clips must be constructed in accordance with S.A.E. recommended practice.

273. *Lubrication.*—The lubrication of all spring connections must be through grease or oil cups, which must be so located as to be readily accessible and of ample capacity, and so designed as to prevent any part of the cup shaking loose through vibration. When cups are not formed integral with the spring connections, they must be screwed in position with standard ¼-in. taper pipe thread ; at least four threads of shank must be engaged.

274. *Retaining Alignment.*—Springs must be provided with suitable means for retaining the leaves in proper alignment with each other. The method used must be shown in the drawing.

275. Scale formed on leaves during heat treatment shall be removed as thoroughly as possible without breaking surface skin.

276. All springs must be constructed and tested in accordance with S.A.E. standards and recommended practice, and must comply with these requirements.

277. *Driving Thrust and Torque.*—The driving thrust and torque may be transmitted through radius rods, the torque may be taken through torque arms, or the springs may be designed to take either or both torque and thrust.

278. If power or torque is transmitted through the chassis springs, the design must be such that the vehicle will not be rendered inoperative through breakage of the main or driving leaf of the spring, and the axle attachment must be such as to prevent relative longitudinal movement of the spring on its seat.

HOW SPECIFICATIONS FOR 3-TON TRUCKS DIFFER FROM THOSE OF 1½-TON VEHICLES.*

The specifications for 1½-ton trucks shall apply in the furnishing of 3-ton trucks, except in the following particulars. Numbers in brackets refer to paragraph numbers in the 1½-ton truck specifications.

1. (24) *Load Capacity.*—The trucks must be of sufficient strength, and provided with sufficient power, to carry and propel the following gross load under the most severe service conditions :—

Pay load	6,000 lb.
Body	1,500 lb.
Three men...	525 lb.
Extra equipment	200 lb.
	8,225 lb.

The extremely severe service conditions under which these trucks will be operated indicate that they should be designed for a nominal pay load of 7,000 to 8,000 pounds.

2. (26) *Weight of Chassis.*—The maximum weight of chassis, without body or extra tool and parts equipment, and without gasoline, water, or oil, must be not more than 8,000 pounds. A definite statement must be made showing exactly what equipment is included in the stated weight.

3. (32) *Wheelbase.*—The wheelbase must be suitable for the use of a 12-ft. body, and shall be not less than 124 in. or more than 156 in.

4. (34) *Gauge.*—The gauge of wheels on 3-ton trucks, measured from centre to centre of fellow bands, shall be as follows :—

5-in. single front tires, 59½ to 64½ inches.

5-in. dual rear tires, 64½ inches.

5. (35) *Engine.*—The engine must be of the 4-cycle type, water-cooled, having not less than four cylinders, and provided with mechanically operated poppet valves. It shall have a total piston displacement of not less than 414 cubic inches, and must develop a torque of not less than 2,475 in.-pounds at not more than 1,000 feet of piston speed per minute. The torque at 500 feet of piston speed per minute shall be not less than 90 per cent. of the maximum torque. The engine must be under a removable hood, and located in a readily accessible position. The hood must be waterproof, readily removable without removing screws or bolts, and must open up sufficiently wide to permit of easy access to engine for inspection or adjustment. All main and connecting rod crank end bearings shall be so designed as to be easily adjusted to take up wear. The piston pin bearing shall consist of a suitable phosphor-bronze bushing properly secured in the connecting rod end. The valve stem guides and push rod guides shall not be as integral with the cylinder casting, but must be separate parts, properly secured in place. The lower half of the crank case must be removable without disturbing the main bearings or the clutch housing, or removing the engine from the chassis. The unit power plant type of construction will not be permitted. The transmission must be mounted as a separate unit.

6. (177) The distance from the back of the driver's seat to the rear end of frame shall be 11 ft. 11 in. This frame length will permit of sufficient overhang of body to allow the installation of towing hooks and rear bumpers.

7. (196) *Data Plate.*—A suitable data plate must be installed in a readily observable location. The data on the plate must include the following :—

Normal load capacity, pounds	6,000
Maximum speed, miles per hour	12
Serial number of motor	——
Serial number of chassis	——

8. (199) *Bodies.*—Bodies are not to be furnished unless specifically called for. The construction of chassis shall be such as to permit the proper installation of body on same, having inside dimensions of 6 ft. 6 in. wide, 12 ft. long, and 2 ft. high, with the floor of body at a height of not over 45 inches above the ground when the truck is loaded. The length of frame back of driver's seat shall be 11 ft. 11 in.

9. (215) The lower gear ratio of transmission shall be suitable for giving a tractive factor of not less than ·338, as required by paragraph 30, and the total low gear reduction of transmission and final drive shall be not less than 50 to 1.

10. (250).—The wheels shall be of suitable size and design for the use of 36-in. × 5-in. single solid S.A.E. demountable rubber tires on front wheels, and 36-in. × 5-in. dual solid S.A.E. demountable tires on rear wheels. All wheels shall be of proper strength to resist the vertical and lateral loads in the most severe service, and with the maximum load and speeds for which the truck was constructed.

11. (253) *Tires.*—On two-wheel drive trucks the tires shall be 36-in. × 5-in. dual tires on rear wheels, and 36-in. × 5-in. single tires on front wheels, both demountable.

12. (260) *Deflection of Springs.*—The deflection of rear springs shall be not more than 1,500 pounds per inch and not less than 1,000 pounds per inch. The deflection of front springs shall be not more than 900 and not less than 650 pounds per inch. The maximum deflection permitted by the permanent stops must be given.

* The standard specifications for 3-ton petrol motor trucks are published by the United States Government in the form of an appendix to the general specifications to indicate points of difference.

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THE FUTURE OF THE BRITISH MOTOR INDUSTRY.

Mr. H. T. Vane, managing director of D. Napier and Son, Limited, manufacturers of the well-known Napier cars, has given his opinions to an interviewer on the subject of the future of the British motor industry. Mr. Vane has taken a leading part since the outbreak of war for the protection of the industry.

In the first place, Mr. Vane pointed out that it will be patent to everyone that the trade at present is entirely dislocated owing to the output of the various factories being taken by the Government for war purposes. The private trade has entirely "gone by the board," and naturally, with the private trade, all sales organisations and internal arrangements. It will be the first duty of the manufacturer when peace is in sight at once to reorganise the sales departments. This at first sight may seem a light task, but it will involve an immense amount of work and careful thought, and is intimately connected with post-war policy. This latter in itself is a problem of the first order, and has to be studied under the greatest difficulty.

Undoubtedly the British manufacturer has gained experience through war conditions, not only in regard to car manufacture, but especially in regard to aero engines, aeroplanes, and aircraft generally. Modern aero engine designs require a very high class of workmanship.

Mr. Vane continued:—A matter of great concern which faces the motor industry is the question of Government protection. Too much cannot be said about this, for whilst the leading manufacturers have been loyally aiding and supporting the Government, their private trade—upon which, after all, they depend—has disappeared, together with the huge overseas market, which is now supplied principally by America. What should be done? It is obvious that the trade should be safeguarded for from three to five years after peace is declared in order to give the British manufacturer time to get going again in his legitimate trade. In the first place, the British manufacturer should be strongly protected by the Government in regard to the home market; that is to say, a tariff or prohibition should be placed on all foreign-made cars, whilst we over here are putting our house in order. Second, steps should be taken by the Overseas Governments to place a tariff on imported cars outside British manufacture. America has up to now reaped enormous benefits through the British manufacturer being unable to supply the ever-increasing demand. While we should grant America more favourable terms than say, for example, enemy and neutral countries, this should be *pro rata*; in other words, while a suitable tax should be placed upon imported vehicles from enemy and neutral countries, America should also pay a tax not less than that imposed by the Americans themselves on British manufactured motor cars prior to the outbreak of war. This should apply to vehicles imported both into Great Britain and the Overseas Dominions at the conclusion of peace. They have reaped the benefit of our inability to supply, and surely it is only fair that we, who have been engaged on war work from the outbreak of hostilities, should be strongly protected by the British Government.

In regard to the vast quantities of cars which are now in use on the various fronts, as to what will become of these after the war, and how they will affect future supplies, Mr. Vane pointed out that probably France, Belgium, Russia, and other Allies will require for internal use a large proportion of army vehicles, and the Government should take in hand at once the question of having these duly allocated. Assume for a moment that myriads of motor vehicles were returned to this country. It would mean a serious setback, to put it mildly, for the trade here, and he could not think that any British Government would subject any British trade to such a menace. The British manufacturers have put their views before the responsible authorities with urgency, and it is now for the Government to arrange for these views to be acted on. Every car or transport lorry should go back to its own factory for repairs and overhaul on agreed terms. It is suggested that the manufacturer should be given an agreed period to dispose of the vehicles, and when he sells, that he sells with a guarantee that the vehicles have been thoroughly overhauled and can be guaranteed to that effect. This arrangement would mean that the public would be supplied with a reliable vehicle from a home factory, and that would safeguard the public as well as the manufacturer's reputation. The motor trade is comparatively new, but it already employs thousands of skilled men—the sort that are the backbone of the nation—and they must be looked after by the Government.

Mr. Vane showed that he is by no means a pessimist. He is a strong believer in the development of motor transport, and also, incidentally, aerial travel and transport. The war, he said, had increased efficiency and output, and providing the industry is protected at the conclusion of hostilities, he has no fear whatever in regard to the future.

TRAVEL BY AIR.

LORD MONTAGU'S SCHEME FOR ROUTES AND RULES.

Colonel Lord Montagu, advisory mechanical inspector to the Government of India, on June 21 lectured at the Central Hall, Westminster, on "The World's Air Routes and Their Regulations." There was a large audience of representatives of aviation and motor manufacturers, Government offices, and the Royal Flying Corps.

The British Empire, the lecturer remarked, was in a peculiarly favourable position for the development of Imperial aviation, for its widely-separated possessions would enable air traffic round the world to proceed without concessions from other nations. He assumed that the average speed of commercial flying would probably not much exceed 80 miles an hour for some time to come. The general principle which should underlie all regulations of air traffic was that slow-speed silenced planes should use the lower levels, and high-speed planes the upper levels of the air. Above the commercial levels he would have another zone of 2,000 feet—4,000 to 6,000 feet—for planes also silenced, capable of speeds between 80 and 120 miles an hour. This would include the general air traffic of the planet for ordinary flying, including a proportion of fast commercial machines. Levels above 10,000 ft. should be internationalised. The upper air should be free to all under certain regulations, provided that pilots complied with certain "rules of the road," and their craft passed as airworthy. The existence of alternate high and low pressure areas, with their respective and regular circulations of wind, would define far more than geographical conditions the chief air routes of the world.

The lecturer assumed that world-flying, as far as passenger services are concerned, would be arranged by stages and not be continuous, and he set out a time table of two routes to India, the southern route being as follows:—

	Miles.		Time.
First Day.	—	Croydon (London)	dep. 7.0 a.m.
	625	Marseilles	arr. 12.30 noon, dep. 1.30 p.m.
	485	Naples	arr. 6.0 p.m.
	1,110		
Second Day.	—	Naples	dep. 7.0 a.m.
	640	West Coast of Crete	arr. 12.15 noon, dep. 1.15 p.m.
	485	Alexandria	arr. 5.45 p.m.
	1,125		
Third Day.	—	Alexandria	dep. 7.0 a.m.
	580	Jof	arr. 12.0 noon, dep. 1.0 p.m.
	460	Basra	arr. 5.0 p.m.
	1,040		
Fourth Day.	—	Basra	dep. 7.0 a.m.
	575	Bandar Abbas	arr. 12.0 noon, dep. 1.0 p.m.
	680	Karachi	arr. 6.30 p.m.
	1,255		

Total distance 4,530 miles.
39 hours 15 minutes actual flying time.
83 hours 30 minutes total time on journey.

In the time table referring to the second route from India—Peshawar to London—a distance of 3,630 miles, it was shown that the actual flying time would be thirty hours and fifteen minutes, and the total time on the journey 59 hours.

The three points of importance were:—(1) As soon as war is over there must be national and international laws for the regulation of flying; (2) oversea and over-Continental routes must be defined in the interests of the whole world; (3) the winds of the world, instead of being a drawback over the surface of the planet, would, if properly used, prove to be of great assistance. "The great development of flying," he added, "produced by this war, will mean that in a few years from now the human race will navigate the air with ease, speed, and safety."

ALBION MOTOR CAR COMPANY.—The net profits for 1916 were £57,174, and £19,347 was brought forward. A final dividend of 15 per cent. is proposed on the ordinary shares, making 20 per cent. for the year, adding £25,000 to the reserve, and carrying forward £17,663.

LONDON MOTOR VEHICLE REGISTRATIONS.—During the quarter ended March 31 the London County Council registered 1,436 motor cars, 467 heavy motor cars, and 805 motor cycles; and licences to drive issued numbered 13,462. Under the Locomotives Act, six annual licences (five at £10 and one at £18), and 68 daily permits at 2s. 6d. each, were issued, and one agricultural locomotive has been registered during the quarter. In the corresponding quarter of 1916 motor car registrations totalled 2,210, heavy cars 552, motor cycles 1,405, and licences to drive 14,345.

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MOTOR TRAFFIC.

THORNYCROFT WAGONS ON HILL-CLIMBING TESTS.

The two illustrations given below are from photographs taken during the hill-climbing tests of a further batch of Thornycroft 3½-ton subsidy machines destined for service "somewhere in France." The scene of the test is the well-known Furley Hill on the Winchester Road, and at the point at which the photograph

Fig. 1.—Gradient 1 in 8.

(Fig. 1) was taken, this has a gradient of 1 in 8. As all the machines succeeded in climbing the entire hill on the third speed the result of the test gave further proof of the splendid pulling power of the Thornycroft subsidy engine.

Fig. 2.—On top.

The machines shown are the firm's 40-H.P., type "J," the entire output of which is being taken by the War Office for military service. Although at the moment Messrs. Thornycroft are unable to supply private customers, either at home or abroad, their clients may rest assured that all orders on their books will be executed as promptly as possible and in rotation.

EXETER COUNCIL have increased the allowance made to the Medical Officer for the upkeep and running of a car from £80 to £100 per annum.

NEW PETROL DEPARTMENT.

The Board of Trade announced on June 26 that the duties hitherto performed by the Petrol Control Committee with regard to the distribution of petrol for civil and industrial needs will in future be performed by a Petrol Control Department of the Board of Trade. The President has appointed Sir Evan Jones, Bart., M.I.C.E., to be controller of the new department, Mr. P. G. L. Webb to be deputy controller, and Mr. H. W. Cole to be chief clerk. Sir Evan Jones will retain his position as Commissioner for Dyes.

The President of the Board of Trade has appointed Sir Walter Egerton, K.C.M.G., to be chairman of the Pool Board, which is responsible for co-ordinating the work of the various oil distributing companies.

PLEASURE MOTORING ON SAVINGS.

In the House of Commons on June 29, Sir C. Johnston asked whether the Board of Trade had discovered the source of supply of petrol to a number of cars on pleasure excursions still to be seen upon the roads; and whether steps would be taken to stop this supply.

Mr. G. H. Roberts (Parliamentary secretary) replied: I am afraid it is the case that a certain number of persons still use motor cars for purposes which are not essential. The petrol for the purpose is obviously being obtained from savings from the restricted amounts authorised by the petrol licences.

Mr. Duncan Millar: Is any attempt being made to check the use of cars for pleasure purposes by stopping the cars on the road and ascertaining the uses to which they are being put?

Mr. Roberts: We aim at restricting the use of petrol by licence. Very severe restrictions have been imposed.

Mr. Millar: Is it not necessary to ascertain how cars are being used, and whether the conditions are being fulfilled?

Mr. Roberts: I think the most effective method is to restrict the supply.

MOTOR VEHICLE INSURANCE.

In the course of his remarks at the annual meeting of the Eagle and British Dominions Insurance Company, on June 28, Mr. E. M. Mountain (chairman and managing director), who was enthusiastically received, remarked that he had had the pleasure of addressing the annual meeting for many years, but this was the first time as chairman. Dealing with motor insurance, he said that the lighting restrictions and the calling up of a very large number of experienced and skilled drivers caused a heavy increase in the number of claims, and the cost of settling claims had also been greatly increased for reasons similar to those to which he had already referred in connection with other departments. The restriction of petrol supplies had also affected to a large extent the best class of business transacted. These restrictions had, however, enabled the company to be the pioneers in offering to the public advantages which were not to be obtained elsewhere. They issued a prospectus showing a greatly reduced premium, in which full cover was offered to owners of private cars, whose licences had not been renewed. This the company found immediately supplied a want, and so great was the demand for the policy that they had now extended this scheme by issuing policies at premiums based on the amount of petrol allowed under licence to apply to holders of petrol licences.

WAR WORK FOR MOTORS IN THE U.S.A.

At a war meeting in Washington on May 25, Mr. Howard Elliott, ex-president of the New York, Newhaven, and Hartford Railroad, and chairman of the Railroad Executive Committee, Council of National Defence, said that the United States had 250,000 miles of railroad, employing over two million men, yet the railroads were inadequate to produce sufficient transportation for the troops who were to be trained for the war and of the vast quantities of foodstuffs and munitions. It required a million a year to be spent on improvements. He exhorted wagon owners to unload freight cars promptly, and he also pointed out the great opportunity of the motor truck for short haul traffic in this time of national crisis. Motor vehicles would be the allies of the railroad instead of competitors, and would help them by relieving them of the unprofitable short haul work.

LINCOLN COUNCIL have purchased a Ford van for the breakdown gang of the Waterworks department and for other purposes.

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MOTOR TRAFFIC.

STRAKER-SQUIRE TIPPING WAGONS.

At first sight the accompanying illustration, representing a scene of municipal sanitary work in a typical London street, would hardly lead one to believe that the Straker-Squire 5-tonner in question is only getting some practice for the much harder work it is really intended for. The machine was constructed with a special Ruston hand tipping body for use by Les Forges d'Hennebont, France, for some very stern work of warlike nature behind the lines. The vehicle is one of a fleet which has preceded it, used for mending

Straker-Squire Tipping Wagon.

roads, filling up shell holes, and generally "paving the way" for a speedy return to its natural mechanical mission in life. In our issue of May 10 particulars were given of this type of machine, together with illustrations showing the special tipping body arranged both for end and side tipping.

OMNIBUS BURDENS.

REFORMS SUGGESTED BY THE CHAIRMAN OF THE B.E.T. COMPANY.

Presiding at the annual meeting of the British Electric Traction Company, Mr. E. Garcke referred to the serious difficulties with which motor omnibus proprietors are faced.

"This young business," he said, "has not received from the Government the recognition which it deserves, and every day the owners of omnibuses are finding it more and more difficult to satisfy the requirements of local and road authorities. There are two points which require settlement. The first is the question of licensing vehicles. To-day almost every borough and urban authority is empowered to make its own requirements. Omnibus services traversing routes 30 or 40 miles in length may be subject to the licensing conditions imposed by ten or twelve different local authorities. The second point is the contribution required from omnibus owners towards the maintenance of the roads. Before the war the Government recognised that money would have to be spent on improving the roads, and a tax was placed on petrol, the proceeds of which were to be used for the improvement of the roads, under the direction of the Road Board. Since the war the proceeds of this tax have been diverted into the Imperial Exchequer, with the result that the road authorities are all endeavouring in their own way to obtain contributions from those who are working omnibuses. In view of the fact that an omnibus in regular service contributes in the form of petrol tax £50 to £60 per annum, it does not seem reasonable that because the Government has appropriated the tax for national purposes the owners of omnibuses should be required by local authorities to contribute a second time."

"SHELL" TRANSPORT AND TRADING COMPANY.—The directors recommend a further dividend of 25 per cent. on ordinary shares, making 35 per cent., free of tax, for the year. The Treasury have granted the issue of one million £1 shares at par, and the directors have decided to offer them to shareholders in the proportion of one new share for every four now held. The dividend will be appropriated in payment. The dividend for each of the three preceding years amounted to 35 per cent. on ordinary shares, while 30 per cent. was paid for 1912.

TECHNICAL COMMITTEE OF THE MOTOR INDUSTRIES.

The third meeting of the Technical Committee of the Motor Industries was held at the offices of the Institution of Automobile Engineers on Tuesday, June 19. Mr. A. A. Remington (Wolseley Motors, Limited) was elected chairman of the committee for the year, Lieut.-Col. R. K. Bagnall-Wild being elected vice-chairman.

Among other matters upon which a definite conclusion was reached was the adoption of the suggestion of Mr. W. H. Paull that the time is now ripe for a serious effort to be made to introduce an international standard of wheel and tire rims for solid rubber tires. It is suggested that France, the United States, Italy, and Russia would be willing to co-operate with Great Britain in this direction. This view has been forwarded to the Engineering Standards Committee.

Steps are being taken to collect data on several subjects of proposed research, and in this connection an important proposal has been made to the committee that a Bureau of Technology should be established where all technical information with regard to various branches of the motor industry may be obtained, and from which would be issued a periodic precis of up-to-date information relating to the latest advances of science and the possibilities of their application in the realm of automobilism. Such a scheme might be of immense service to the engineers of the automobile industry, but it cannot go through without the financial support of the firms, although it is quite likely that the Government would, through the Department of Industrial Research, make a substantial contribution to income. As yet, the subject has not received any detailed consideration, but it is one on which those interested are invited to express their views.

Another matter of great importance that has been brought before the committee is the proposal to form a central organisation for the better co-ordination of engineering training, and in this matter the committee is already giving all the support that has been asked of it at the present juncture.

The committee is now represented on all the Engineering Standards Committee Automobile Sub-Committees, and steps have been taken to render every assistance in this direction. Steps have also been taken to ensure the proper representation of motor industries on the Civil Aerial Transport Committee, as there is no doubt that mechanical transport must play a very important part in any such scheme.

MOTOR TRAFFIC NOTES.

THE WILLYS-OVERLAND CAR.—Mr. C. L. Van Bever, the energetic Canadian, who started the Goodyear tire business in this country, has acquired a controlling interest in the Willys-Overland motor car business in this country, and will take an active interest in its conduct in the capacity of managing director.

MOTOR DRIVERS' WAGES AWARD.—Sir George Askwith's award respecting the wages of drivers of commercial petrol-driven vehicles and drivers of steam wagons was issued on June 29. It gives, for a six days' week, a minimum of 30s. for cars up to 25 cwt., rising to 50s. for cars over two tons. Overtime is to be paid at the rate of 6d. to 9d. per hour, according to the weight of the car. On Sundays and holidays double wages are to be given, and after a journey of more than 14 hours there must be a nine hours' rest.

STATE OWNERSHIP AND CONTROL.—Sir Maurice Fitzmaurice, chairman of the Canal Control Commission, on June 27 received a deputation from the Dock, River, and Wharfeside Workers' Union, who submitted proposals for State ownership and control of inland waterways, with management through a representative Advisory Committee. It was stated that there was a strong feeling permeating labour that all modes of transit, including railways, docks, navigable rivers, and canals, should be under the direct control of the State, with co-opted representatives of labour on the management. Sir Maurice promised to lay the views of the deputation before the members of the Commission.

MR. A. J. SLINN.—A complimentary dinner was given at the Trocadero on June 13 to Mr. A. J. Slinn, the well-known publicity manager of Messrs. D. Napier and Son, Limited, to commemorate his recent wedding with Miss Alice Taylor. Mr. Jeremiah MacVeagh, the witty Irish M.P., presided, with Mr. F. H. Beckham, the chairman of Wills, Limited, in the vice-chair. Some 30 of the intimate friends of Mr. Slinn were present. Mr. MacVeagh made one of his characteristic speeches, diverging for a moment from the occasion to make a touching reference to the tragic death—just then announced—of his old and intimate friend, Major Willie Redmond. Other speakers followed and gave notable testimony to the popularity of Mr. Slinn, and to the esteem in which he is held by a wide circle of friends and acquaintances.

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF WEST HAM.

MOTOR AMBULANCES.

The Corporation are prepared to receive tenders for the supply of Two Motor Ambulance Vehicles for general accident and medical transport work.

Each vehicle is required to accommodate two stretcher cases, with attendant. The body and fittings should be in accordance with the latest standard practice, and the vehicles complete with regulation lamps and fittings, and finished in colour to be approved.

Tenders should contain specification and details of chassis, tires, body and fittings, and full particulars of speed, weight, consumption of petrol or electricity, illustrations of similar vehicles made by the firm tendering, and references to users to whom application for particulars may be made, and the date by which delivery can be made.

Further information, if required, can be obtained from the Medical Officer of Health, Dr. Sanders, Town Hall, Stratford.

The Contractor whose tender is accepted, and with whom a contract is entered into, will be required to pay all workmen employed by him in or about the contract such rates of pay, and observe such hours of labour, as are embodied in the schedule, which will be part of the contract. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

Tenders should be endorsed "Tender for Ambulances," and delivered in a sealed envelope to the Town Clerk, Town Hall, West Ham, E. 15, by 4 o'clock on July 17th, 1917.

GEORGE E. HILLEARY,
Town Clerk.

Town Hall, West Ham.
June 27, 1917.

CITY OF WINCHESTER.

GENERATING SET.

The Electricity Committee of the Winchester Corporation are prepared to receive offers for the purchase of a Belliss Six-cylinder Tandem Compound Engine, direct-coupled to a Parker Bi-Polar Shunt Wound Generator; output, 200 kilowatts, 420-460 volts at 420 revs. per minute, to work at 160 lbs. steam pressure.

The above set which is in excellent condition, can be seen running on load by appointment, on application to Mr. R. Ayton. City Electrical Engineer, Electricity Works, Winchester.

Sealed tenders, which must include dismantling and removal of the plant, to be endorsed on the outside "Tender for Generating Set," must be delivered to me at the Guildhall, Winchester, not later than noon on August 2.

The Corporation do not bind themselves to accept the highest or any tender received.

THOMAS HOLT,
Town Clerk.

Guildhall,
Winchester,
July 6, 1917.

ERITH URBAN DISTRICT COUNCIL.

The Erith Urban District Council are prepared to consider offers for the purchase of:—

One "Bettington" type Water-tube Boiler, evaporative capacity 10,000 lbs., at 160 lbs. working pressure, with all accessories in excellent working condition.

Purchaser to bear cost of dismantling and removal.

Offers to reach the undersigned, from whom all particulars may be obtained, not later than July 28th.

Walnut Tree Road,
Erith.

JOHN CHARLES WILLIAMS, A.M.I.E.E.,
Engineer and Manager.

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Wanted, Fitter used to tramway truck repair and overhaul work. Ineligible for military service. Wages, with bonus, 51s. week of 53 hours.—Apply, MANAGER, Tramways, Birkenhead.

SWITCHBOARD ATTENDANT.

Wanted for period of war, Switchboard Attendant (ineligible) for 3-wire lighting and traction station.—Applications with references, stating experience, wages required and when able to start, to be sent to BURGH ELECTRICAL ENGINEER, Perth.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

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Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

Electric Tramcar Handbook

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By W. A. AGNEW.

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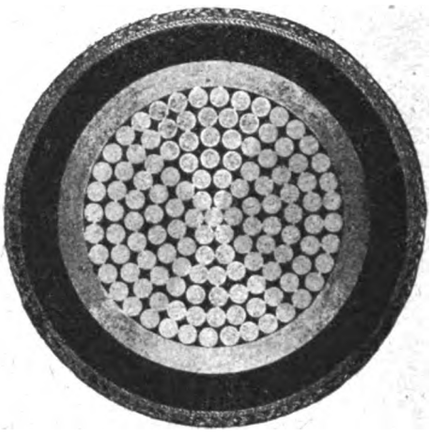

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Tramway AND Railway World

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SATURDAY, JULY 14, 1917.

PREVENTION OF LABOUR TROUBLES.

To say that the latest development of the war bonus trouble at Manchester does not promise well for the proposed Advisory Conciliation Boards of tramway authorities and employees of Yorkshire would be too sweeping an assertion. Indeed, the new difficulty might have been avoided if such a Board had been in existence in the County Palatine. In order to end the intolerable situation created by the Manchester employees' adoption of "stay-in" tactics, the two parties agreed to the offer of the Ministry of Labour to arrange for a speedy re-opening of the arbitration with the results of which the employees were dissatisfied. Against this separate treatment, the twenty remaining authorities and their employees have lodged a protest, and have suggested that the separate arbitration be adjourned, so that an early arbitration can be held on the whole question. It seems unfortunate that the Minister of Labour has rejected that suggestion, notwithstanding the assertion of a leader of the Manchester men that if it were adopted further trouble would be certain, unless the new award made a discrimination in favour of Manchester, to correspond with the higher cost of living. The latter demand serves to accentuate the views advanced by Mr. E. H. Edwardes, in opening the discussion at the recent congress of the Tramways and Light Railways Association, on standardisation of conditions of labour and rates of pay. While the opener and others recognised that it is not possible to fix a standard wage for all tramways, it was admitted that by division into areas it would be possible to arrange wages in such districts according to the cost of living. This would obviate the complaint made at arbitrations that a great variation exists for no apparent reason, in towns adjoining one another. For an arbitrator to have to deal with such variations renders his task exceedingly difficult if the dispute concerns wages and not war bonus. To deal with the latter payment is an easier matter, for the increased cost of living due to the war may be taken as uniform. For this reason the setting up of a separate arbitration for Manchester cannot be defended. For one tramway committee or company to break away from a county organisation must nullify any thought of unity and eventually break up an association. The dissatisfaction with the award is not confined to the city, even though the men in all but one of the other towns were not so unpatriotic as to indulge in the tactics adopted by the Manchester tramwaymen. One cause that at present contributes to misunderstanding is the refusal of some tramway operators to meet deputations of employees. The time for such an attitude has passed, and by organisation into areas there will be no need for individual consultations on matters general to the constituent bodies. Matters must not be allowed to rest merely with the organisation of the employers; to achieve a full measure of smooth working there must be an extension of the action of the Yorkshire Municipal Association in endeavouring to form a joint board of employers and workmen to assist in the solution of difficulties. This scheme has been worked successfully in many trades, and it is in accord with the proposals presented on June 28 by the Reconstruction Committee appointed by the Government for the purpose of permanently improving the relations between employers and workmen. From the difficulties arising from the Lancashire and Cheshire arbitration we hope to see the two sides unite in the adoption of that course. The scheme is more far reaching than the existing conciliation committee that can be formed under the auspices of the Board of Trade, inasmuch as it will afford facilities for discussion of difficulties before they reach the stage of creating discontent among the employees.

GLASGOW TRAMWAY STATISTICS.

An abstract of the accounts of Glasgow Corporation Tramways for the year ended May 31 last, showing the extraordinarily favourable financial position of the undertaking, was published in our issue of June 23. The annual report of the Tramways Committee, along with the full accounts, forming a substantial pamphlet of 50 pages (13¼ in. × 8¼ in.), has now been issued, and it contains much interesting information relating to what is in some respects the premier tramway system. Without repeating the abstract of accounts already published, a few additional facts may now be given. A table shows the accumulations of sinking fund from year to year since 1895. The balance of debt unredeemed at February 22, 1917, was £2,328,800, and by resolution of the Corporation this sum was transferred from the depreciation and renewals funds investment account to the sinking fund at that date, so that the department is now entirely free from debt. The balance remaining at the credit of the depreciation and renewal funds is £181,200. The following balances stood at the credits of the funds named at May 31 last:—Third party accident fund £12,606; employers' liability fund, £2,235; fidelity fund, £225 (this fund has been in existence for only a year); general reserve fund, £31,034.

The number of cars in stock is 862. The car mileage during the year was 25,786,047, compared with 24,063,309 in the previous year, and the passengers numbered 388,204,876, against 362,371,464. The receipts were equal to 11.50*d.* per car mile, against 11.05*d.* The receipts per car mile have only once been exceeded: namely, for the year 1901-2, when they were 11.66*d.* The percentages of passengers carried at different fares were as follows:—½*d.*, 63.87; 1*d.*, 25.79; 1½*d.*, 6.44; 2*d.*, 2.0; 2½*d.*, .01; 3*d.* and upwards, .09.

The total rates paid on the undertaking were £74,089, equal to 5*s.* 6*d.* per £1.

At the close of the year there were 1,514 women conductors and 203 women drivers; 450 women were employed on car-cleaning. Various war bonuses were added to wages during the year. The payments to the Common Good since 1894 aggregate £804,913. The total number of employees who have joined His Majesty's forces since the outbreak of war is 3,129. Of this number the Committee regret that intimation has been received of the death of 201.

HALF-PENNY OMNIBUS FARES WITHDRAWN.

As anticipated for some time, the London General Omnibus Company found it necessary to abolish half-penny fares on their omnibuses, as from July 9th, as well as fares with half-penny denominations, such as 1½*d.* and 2½*d.* The maximum distances for 1*d.*, 2*d.*, etc., are not altered. The change, it is reported, has been made owing to the difficulty of collecting fares on the omnibuses which are so heavily loaded because of the reduction in their number. The withdrawal of half-penny fares, however, it will be noted, follows on a similar course in regard to London tramway fares, but on the tramways there are still 1½*d.* and 2½*d.* fares. The National Steam Car Company on Thursday also withdrew their half-penny fare.

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THE TROUBLE IN LANCASHIRE.

GOVERNMENT AVERT STRIKE IN MANCHESTER.

The tramway authorities of Lancashire and Cheshire who are concerned in the bonus award with which the Manchester employees disagreed had a conference in Manchester on July 5, under the chairmanship of Alderman Linsley, of Salford. A letter was read from Mr. T. Neafsey, secretary of the Lancashire and Cheshire District Council of the Tramway Workers, asking that a deputation should be received to discuss the grievance arising from the award. The conference agreed to receive such a deputation on July 9, to discuss "any grievance or difference arising out of the administration of the recent award contingent upon the Manchester tramway employees immediately resuming the working conditions prevailing prior to the award."

Under the same circumstances the Manchester Tramway Committee are prepared to consider reopening the question of the award, "having regard to any special conditions that may operate in Manchester."

The ballot of the Manchester employees taken on July 6 resulted in 967 favouring a strike and 687 voting against such a step, and in favour of having the case reopened at once before the arbitrator. An analysis of the vote shows that 47·8 per cent. of those entitled to vote supported a strike 33·14 were opposed, and 19·9 did not vote.

On July 6 the Ministry of Labour sent a telegram, a copy of which was received too late for mention in our issue of last week, to the secretary of the men's union at Manchester pointing out that the strike would be illegal, as being in contravention of, and subject to penalties of, the Munitions of War Act. The Ministry understood that the Manchester Corporation offered a settlement on the following lines: "That providing the employees immediately resume the working conditions existing prior to the last arbitration the Tramway Committee will be prepared to consider the question of reopening the award, having regard to any special conditions that may operate in Manchester. The Minister is prepared, providing the conditions of this offer in regard to resuming ordinary working conditions is complied with, and no strike takes place, at once to arrange for the difficulties that have arisen since the last award was made to be submitted to arbitration within seven days, and the decision announced within fourteen days."

The reply sent by the secretary on July 7 was as appended:—"In reply to your telegram of yesterday's date, I wish to inform you that the Manchester tramway employees have resumed their working conditions existing prior to the last arbitration according to the terms laid down by you in your telegram, and are therefore now awaiting the arbitration which you have undertaken to arrange."

Burnley had two days' experience of a "stay-in" strike on the part of the tramway employees against "overcrowding" and working overtime. After the first day there was a 24 hours' suspension of the strike while two delegates of the men attended a meeting at Manchester, but as no message came from them at the end of that time it was put into operation for a second day. When "stay-in" terminated publicity was given to the following resolutions which were adopted at Manchester. "That hostilities cease for the present with a view to endeavouring to arrange a meeting with the Managers' Federation, as advised by Sir David Shackleton," also that "no one be taught the duties of driver or conductor unless he or she was learning before the dispute commenced, or were at the time members of our association."

A new development arose on July 9, on which date a joint conference of the Lancashire and Cheshire Tramway authorities and the men's Union was held at Manchester. The following telegram, signed by Mr. J. Barnard, hon. secretary of the Association of Tramway Authorities, and Mr. Neafsey, secretary of the employees' Union, was subsequently sent to the Ministry of Labour:—

"Lancashire and Cheshire tramway authorities and officials of employees' union had a conference to-day and agreed to enter a joint protest against separate arbitration for Manchester being proceeded with, and to suggest that the proposed arbitration be adjourned so that an early arbitration can be held on the whole question, for which both parties concerned are agreeable. If the Ministry of Labour insists on the Manchester arbitration proceeding, we respectfully suggest that the whole arbitration be reheard at the same time. In the event of joint arbitration both parties are mutually agreed that any decision shall be binding for a period of four months from the date of the award." Representatives of Manchester attended, but took no part in the proceedings.

To the above telegram the following reply was received from Sir G. Askwith:—"Your telegram received. The question referred to relates only to special conditions that may operate in Manchester, and is an agreed reference between the Manchester Corporation and their employees." Interviewed on the matter, a prominent tramway manager said: "We regard Sir George's treatment of our communication as nothing short of a direct snub. We asked that our case should be arbitrated upon at the same time as that of Manchester. Why we should be treated in this offhand manner I cannot understand, as we made the offer at the suggestion of Sir David Shackleton." The employees are equally dissatisfied.

Joint conferences of representatives of the Lancashire and Cheshire tramway authorities and of the officials of the men's union met on Thursday at Salford, and sent the following joint telegram asking for an interview with Sir David Shackleton to-day (Saturday) respecting the recent award. The telegram added, "Considered that this interview must be held before hearing of Manchester arbitration, or Ministry's consent given for re-opening of general arbitration the same time as Manchester arbitration."

The conference with the committee on Production has been fixed for Monday next in London.

BIRMINGHAM TRAMWAY PLANS.

Before next autumn a report will be presented to Birmingham Corporation by a Joint Committee of the Public Works, Tramways, and Town Planning Committees, recommending road widenings, tramway extensions, the construction of ring roads, and the linking up of main or arterial thoroughfares. The report will emphasise the need for concerted action, and apart from street widening on an extensive scale, the committee have prepared a plan which connects up one important street with another, and one district with another, with a view ultimately of establishing a much enlarged cross-city tramway system.

The immediate sanction of the Council will be asked to a portion of the scheme relating to the acquisition of frontage sites on main arteries. Large numbers of leases are falling in, and the joint committee desire to acquire, as opportunities occur, plots of land, so that ultimately they may re-arrange the street lines with the object of giving a greater width of carriage-way.

INCREASING COST OF MATERIALS.

Mr. Henry Mozley, general manager of Burnley Corporation tramways, in his report for the last financial year, remarks that the cost of materials has gone on increasing and still shows a tendency to rise. He gives the following percentage of increases in the cost of the various materials compared with the prices before the war:—

	Per cent.		Per cent.
Tires	235	Screws, iron	81
Axles	258	Gears	64
Bar iron	89	Pinions	130
Steel	143	Gear cases	46
Axle brasses	26	Armature bearing caps	125
Trolley wheels	26	Raw linseed oils	64
Armature wire	79	White lead	111
Commutators	26	Zinc white	119
Malleable iron castings	21	Spring wire	60
Controller segments	52	Brake blocks	20
Controller fingers	28	Cast iron	22
Lubricating oils, machinery	166	Deal floor boards	154
Lubricating oils, black	71	Pitch Pine	92
Carbide	77	Oak life-guard strips	60
Glass	23	Ears	21
Bolts	126	Frogs	45
Brushes Kitool	54	Guard wire	191
Coke	57	Tickets, ordinary	125
Sand	36	Tickets, workmen's	57
Cotter pins	125	Copper bonds	100
Wire nails	394	Files	60
Screws, brass	105		

MISCELLANEOUS NEWS AND NOTES.

The Derbyshire and Notts Tramways Act received the Royal Assent in the House of Lords on July 11.

Age of Commercial Motor Drivers.—A proposal to license youths between 16 and 17 years to drive commercial motor vans during the war is being considered by the Local Government Board.

Halifax Tramways Committee has granted an option available until August 4 to purchase from it the land and buildings at High Street Wells, originally used as a car shed, at a price of £6,283.

Passes Refused.—Darwen Tramways Committee have declined to grant further passes to local guardians attending board meetings and to the local special constables.

Light Railways Acts.—The Board of Trade have recently confirmed the following Order made by the Light Railways Commissioners:—Darlington Light Railways (Amendment) Order, 1917, amending the Darlington Light Railways Order, 1902.

The Channel Tunnel.—Mr. Arthur Fell, M.P., chairman of the Channel Tunnel Committee, has forwarded a request, signed by 110 M.P's, to the Prime Minister, asking for facilities for adopting a motion on this subject.

A Cork Dispute Settled.—The employees of the Cork Tramway and Lighting Company have accepted an offer of an increase of wages of 2s. 3d. per week to motormen and conductors, with half-an-hour's less work in the day. Other branches of the service get an increase of 1s. 6d. per week.

Increase of Fares at Lincoln.—Lincoln Town Council have agreed to increase all their tramway fares by 50 per cent. The idea is that the increase is only to be temporary, and that after the war, when more labour is available, the matter will be reconsidered.

Coal by Sand-Cars.—Newcastle Tramways Committee have agreed to the principle of a scheme submitted by Mr. E. Halton, the general manager, for utilising the tramway sand-cars during next winter for the purpose of distributing coal to householders. A detailed report on the matter is to be prepared.

Power Difficulties at Wolverhampton.—The demand for electric power at Wolverhampton has reached such proportions as to give rise to serious difficulty. On Monday the tramway supply was cut off at about 2.30 p.m. and was not resumed till about four hours later All the available plant is in use, and the manufacturing works are supplied before the tramway service. The plant is to be increased as soon as possible.

Collision at Brentford.—A collision took place on the London United Tramways at Brentford High Street on Monday morning. Owing to the points at a cross-over being inadvertently left open an east bound car swerved, swung across the road, and ran into

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a Hampton Court car. The latter was fortunately going slowly, and none of the passengers were hurt, although both the cars were badly damaged. The street was blocked for some time.

Wages in Montreal.—The Montreal Tramway Company have increased the pay of their motormen and conductors by two cents an hour. This means that men who have served a period of less than four years will receive twenty-five cents an hour; four-year men, twenty-six cents; men who have served five years and over, twenty-nine cents. Men will continue to pay half the cost of their uniforms in the first three years, after which they are allowed a new uniform free when required.

Depreciation Allowances at Burnley.—The amount required annually for depreciation at the present date on the Burnley Corporation tramways is set out as follows by the general manager in his report for the past year: Rails, 3.21 per cent.; paving, 1.93 per cent.; overhead equipment, 2.12 per cent. (30 years' on poles, remainder 30 years); depot and buildings, .42 per cent. (60 years); machinery, 1.77 per cent. (30 years); tower wagon, 5 per cent. (15 years); rolling stock, 2.56 per cent. (trucks and motors 30 years, bodies, 20 years).

Dishonest Passengers' Methods.—In a prosecution of a number of persons at Manchester for attempting to avoid payment of tramway fares and for riding in excess of the stages paid for, the Tramways Committee's solicitor stated that since the introduction of women conductors a practice seemed to be springing up of passengers keeping their fares in their hands without making any attempt to pay unless asked or an inspector boarded the car. Two of the defendants had travelled over four miles before inspectors discovered them without tickets. Fines of 20*s.* were inflicted in two cases and 10*s.* in others.

Rolling Stock for Newport.—At a recent meeting of the Town Council, Mr. J. Moxon, chairman of the Tramways and Electricity Committee, referring to the tramways extension, said that it was impossible to obtain new cars during the war. The London County Council had offered six top-covered double-deck cars with a seating capacity of sixty passengers, which were twelve years old, at £450 apiece, but unfortunately the cars could not pass under the bridges. It was stated that a new car of a similar type would to-day cost £1,200. The Committee were given full powers to deal with the question.

Newcastle Employees' Demands.—At a meeting of the Newcastle Corporation Tramways Committee on July 6, Mr. Richard Mayne, chairman, presiding, a deputation was received from the Tramway Workers' Union in support of an application for further bonuses for employees, both men and women. The following bonuses were asked for: female conductors, 3*s.*; male conductors under 21, 5*s.*; female car cleaners, both day and night workers, 3*s.* The Committee decided to refer the demand to the Committee of Production in London, on the understanding that the judgment of the Government authorities should be accepted as final by both parties.

Town Council Debates.—Proposals were made at a recent meeting of the Liverpool City Council that the debates should be reported verbatim. Commenting on the suggestion, the *Liverpool Daily Courier* observes that it would add a new terror to life. "With what pained surprise," it continues, "would Mrs. Councillor read the verbatim report of her spouse's great speech on the New Dock or the Increase in Tramway Fares, reproduced with the infallible accuracy of a gramophone record. Perish the thought! Let us have the gems of municipal eloquence, 'of purest ray serene,' after the reporter has done his polishing. Sometimes, alas! even after the polishing, we are cruel enough to wonder if they are really diamonds or only 'paste' after all."

Defence of a Willing Worker.—Two motor lorry drivers in the employ of Bath Tramways Company and an employee of the Shell Marketing Company were charged at Devizes with stealing four tins of motor spirit, the property of the latter company, who had hired lorries from the Tramways Company. A solicitor, who defended the Tramways Company's men on behalf of their employers, said that the company defended solely on account of their good character, and particularly because one of them went out with his vehicle last winter when some men would hardly venture to do so. Fines were inflicted. Time was allowed for payment, as the solicitor stated that after the conviction it was doubtful whether the company could take the men back.

Yorkshire Council of Municipal Tramway Authorities.—Ald. Meyer, chairman, and Councillor Sessions, vice-chairman, who represent York Tramways Committee on the Yorkshire Council of Municipal Tramway Authorities, have been appointed on the sub-committee which is considering the question of the formation of an Advisory Conciliation Board to assist in labour difficulties. On July 2, at a meeting of the York Tramways Committee, Ald. Meyer stated that the formation of a joint board of employers and employed was likely to have very satisfactory results with regard to the labour position in the tramways undertaking of the county. He thought this was the line upon which future reconstruction and reorganisation of industry would take place.

Small Tools.—An extremely handy and well-bound volume is the pocket edition just issued by Messrs. Alfred Herbert, Ltd., Coventry, of the fifth edition of their standard small tool catalogue. The pages are photographic reproductions on a smaller scale of the pages of the standard catalogue, and though in some cases the print is small it is very clear. The work of reproduction has in fact been well done, and we have a volume which is quite capable of being carried in the pocket. As over 2,000 men use small tools in the firm's works, they are able thoroughly to test the tools they sell. Though an enormous number of tools and accessories are described and illustrated in the book, it is not possible to include particulars of all the firm can offer, as they are constantly adding new lines. The book has a good index.

Military Demand at Plymouth.—Ald. S. H. Phillips, chairman of the Tramways Committee, has informed the Council that demands were being made by the military authorities, which, if persisted in would result in a large decrease of the number of cars at work. The military were calling up the only man the manager had to work the lathe. If he was taken the work to a large extent broke down. They also asked for seven drivers. That meant four cars being taken off. If they could not retain these men they must reduce the service, and then they would have more complaints from the public. The manager's report for June showed that the cars carried 437,000 more passengers and earned £315 more than in the corresponding period of last year. At the same time they were obliged to leave a large number of passengers behind.

The London Air Raid.—On Saturday of last week London was again visited by hostile aircraft. No warnings were given except to Government offices, hospitals, some schools and a few other establishments; consequently the public were taken unawares. Passengers by omnibuses and tramways in many cases had the first intimation of the raid by observing fleets of aeroplanes overhead. In some cases the journeys were continued, but in others the conductors stopped the vehicles and advised the passengers to alight and seek shelter. A story is circulated that one omnibus served as a guide for a hostile aeroplane which had apparently lost its way and followed the omnibus for some miles. Bombs were dropped in various parts of London intermittently for about fifteen minutes. Fortunately no omnibus nor tramcar was injured, nor were any of the tramway depots or garages attacked.

Tribunal Decisions.—Women Employees' Discipline.—The military representative at Doncaster informed the Tribunal that he would appeal against the exemption given to a tramway inspector until September 30, the man being only 29 years of age, the exemption age being 31. The chairman of the Tribunal, who is also chairman of the Tramways Committee, said they had got to the limit, having parted with 82 men. They employed 71 women as drivers and conductors, and the passengers had increased from 100,000 before the war to 170,000, and they had the same number of inspectors. The women had done remarkably well, but they were human in more ways than one, and they could not get the same discipline from them that they could from men. Although Mr. J. W. Hame, the general manager, stated that most of the 20 men appealed for were indispensable motormen, the York Tribunal have ordered the release of ten of the men at the rate of two per fortnight.

Accident During Restricted Lighting.—A jury at Derbyshire Assizes have awarded £500 damages to a young woman who sued the Derby Corporation for damages for injuries sustained owing to the alleged negligence of a motorman. The plaintiff at 9.45 p.m. on September 17, 1916, crossed between two cars opposite the Royal Hotel with two or three yards interval between them. The rear car advanced without any warning and plaintiff was crushed. There was a reduced light at the place. The motorman stated in evidence that after he had stopped at the spot the brake slipped off and the car rolled, although there was no power. People getting on the car would make it start. The first girl ran between the cars, and the second just got wedged between them. Gilbert Manning, shed engineer to the department, said the car was in good condition when tested after the accident. If the brakes were not on, people getting on at the rear might cause the car to move, but very slowly.

Condition of Chester Track.—Reports received from the city surveyor and the electrical engineer on the condition of the tramways track and overhead equipment at Chester have been ordered to be sent to each member of the Corporation, in order that the whole matter may be considered at a meeting of the Council in committee. The Sheriff, on obtaining the consent of the Corporation to this course, said that the reports were made to the Tramways Committee on November 25 and February 1 last, and the contents were so important that the committee considered the responsibility for taking action should rest with the council. The matter was a source of danger to the city. Nothing could be done at present to remedy it, but the council could consider what was to be the future policy of the Tramways Committee. Alderman J. Jones, chairman of the committee, said they were anxious to get the track restored, but it was an utter impossibility, and even after the war they would not be able for some time to make a thorough job of it. The committee were doing as much repairs as possible, and if anything further in that direction could be suggested, they would adopt it.

£1,000 Insurance.—Mrs. Hannah Newman, at Nottingham Assizes on June 30, recovered £1,000 from the General Accident Assurance Corporation on a coupon appearing in a newspaper in respect of the death of her husband who was killed in a tramcar collision. It appeared that Mrs. Newman and her husband had just boarded a car, when a runaway car dashed into the stationary vehicle and killed Mr. Newman almost on the spot. The defendants in their newspaper advertisement agreed to pay £1,000 on death by accident to a fare-paying passenger by train, steamer, motor or horse omnibus, or other licensed vehicle plying for hire. Two forms in the paper had to be filled up—one to be given to the newsagent ordering the paper to be supplied regularly until further notice, and the other to be sent to the office of the newspaper for registration. Newman had fulfilled both the conditions, and the case turned on whether he was a "fare-paying passenger." The defendants argued that he was not a "fare-paying passenger" on the overturned car, and the contention on behalf of the plaintiff was that, although he

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had not actually paid his fare, he was intending to do so, that he had actually boarded the car, and that, as a matter of fact, his umbrella was found inside it after the accident. When plaintiff's case closed, counsel intimated that an agreement had been come to between the parties whereby the defendants would pay the full amount claimed (£1,000) and withdraw any imputations, the costs being agreed upon. Judgment was entered accordingly.

PERSONAL.

Mr. T. Potts has been appointed traffic manager of Doncaster Corporation tramways.

Mr. W. J. Best has been appointed staff engineer at Kelham Island power station, Sheffield, at a salary of £180 per annum.

Mr. A. S. Channon, electrical engineer of Grimsby, has been granted an additional war bonus of £50 per annum.

Mr. S. T. Allen, electrical engineer at Wolverhampton, has been granted an increase in salary from £600 to £800 a year.

Mr. Robert Caven, manager of the Bessbrook and Newry Tramway Company, has retired on a pension after ten years' service.

Mr. Martin Hamilton has been appointed manager of the Bessbrook and Newry Tramway Company, in succession to Mr. Robert Caven.

Mr. Henry Mozley, general manager of Burnley Corporation tramways, has been voted an increase in salary by the Tramways Committee from £450 to £525 per annum.

Mr. R. L. Horsfield, manager of Walsall Corporation tramways, will, if the recommendation of the Tramways Committee be adopted, be granted an increase of £100 a year in salary.

Mr. Bromley Holmes has been appointed chairman of a sub-committee specially appointed to deal with the supply of electrical energy to the Mersey Docks and Harbour Board. This committee will consider all questions of electric supply charges and extensions before they are submitted to the tramways and electric power and lighting committee.

Mr. E. Hatton, general manager of the Newcastle Corporation tramways, was welcomed by the chairman of the Tramways Committee, Mr. Richard Mayne, at a meeting on July 6, after his indisposition. Sir J. Baxter Ellis said that the chairman deserved the thanks of the city for the able way he had managed the heavy traffic in race week in the absence of Mr. Hatton.

Mr. G. F. Glass, on the recommendation of Mr. I. Bulfin, the general manager, has been appointed traffic superintendent of Bournemouth Corporation tramways, at a salary of £180 per annum, rising by annual increments of £20 to £220, in succession to Mr. R. O. Baldwin, who, as recently announced, has been appointed manager of Exeter Corporation tramways. **Inspector Rushton** succeeds Mr. Glass as chief traffic clerk.

Point Boy Awarded the Military Medal.—Private F. Shields, of the King's Liverpool Regiment, has been awarded the Military Medal, and has received a letter from Lieut.-General Sir Aylmer Hunter Weston, K.C.B., D.S.O., congratulating him on the honour conferred upon him by the King for gallant conduct. Before joining the forces Private Shields was a point boy in the employ of the Liverpool Corporation tramways. He is now only 19 years of age, and has been in France for eighteen months.

Mr. E S. Rayner, who recently resigned his position as tramway manager and engineer of Doncaster Corporation to accept an important appointment in the Admiralty, has been presented with a gold wristlet watch in the presence of a large gathering of the officials and staff. Mr. G. A. Roberts made the presentation and expressed the cordial goodwill and best wishes of the staff. At a meeting of the Tramways Committee, the chairman, Councillor Balmforth, congratulated Mr. Rayner and wished him success in his new sphere of work.

CONTRACTS AND ORDERS.

Leeds Tramway Committee have accepted tenders for the reconstruction of the tramway in Victoria Road, Headingley.

Messrs Mossay and Company are to supply an electric vehicle to Dewsbury Town Council at £911.

The General Seating Company Ltd., has received an order from Derby Corporation tramways for one hundred illuminated route number indicators.

Glasgow Tramways Committee have accepted a tender from the Whitecross Company, Ltd., Warrington, for the supply of span wire. The Electricity Committee have accepted the tender of Babcock and Wilcox, Ltd., for additional coal-handling plant required at St. Andrew's Cross station.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended June 30 give total receipts of £108,524, or £19,188 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £92 12s. 9d. per mile of single track, and last year at the rate of £83 13s. 8d., thus showing an increase for the week of £8 19s. 1d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power Company have declared a dividend of 2½ per cent. on the common stock.

Browett, Lindley and Company, Ltd.—After providing for interest charges, and writing off £6,134 for depreciation, the net profit for 1916 was £9,450. The full year's dividend of 6 per cent. has been paid on the preference shares, and an extra distribution of 3 per cent. on account of arrears, and a dividend of 4 per cent. on the ordinary shares, leaving £3,540 undivided subject to excess profits.

Metropolitan Railway Carriage, Wagon and Finance Company.—The directors have announced that the Treasury has given its consent to the issue of shares represented by the proposed capitalisation of the part of the undivided profits and reserve and the balance of the present authorised capital in hand. The bulk of the issue, viz., £1,424,700, will be allotted to the shareholders. It was expected that the Treasury would give its consent, as the company is engaged directly in Government work and also in financing such undertakings as the British Westinghouse Electric and Manufacturing Company.

The General Electric Company have again had an excellent year. As compared with the previous year, the gross profit has increased by 35 per cent., and the net profit 25 per cent. The ordinary dividend remains unchanged at 10 per cent. The sum of £40,000 has again been transferred to the reserve fund, and the total of this fund now amounts to £400,000, with the addition of £100,000 placed to special reserve to cover pre-war contingencies. The grants to dependants of men on active service absorb £11,500. All the allied and subsidiary undertakings have continued to do well with the exception of one or two which have been adversely affected by the state of war. The results for the last five years are set out below.

Year ended Mar. 31.	Gross profit.	Net profit.	Ord. div.	Special appropriatn's	Depreciation allowance.	Carry forward.
1913	145,300	93,200	10	33,000	24,500	32,300
1914	157,900	101,400	10	33,000	24,300	36,700
1915	164,900	114,300	10	27,500	18,900	39,700
1916	196,300	150,300	10	53,000	19,300	48,300
1917	265,200	165,700	10	62,000	30,500	89,800

TRADE ITEMS.

Brown, Boveri and Company, Ltd.—Caxton House having been taken over by a Government department, Messrs. Brown, Boveri and Company have secured temporary offices at 9, Old Queen Street, Westminster, S.W. 1.

Formite Products.—By an arrangement with the Damard Lacquer Co., Ltd., of 68, Bradford Street, Birmingham, Messrs. Pinchin, Johnson and Co., Ltd., of 26-27, Bevis Marks, St. Mary Axe, London, E.C., have been appointed the sole selling agency for Formite Products in Great Britain and certain Continental countries. All communications in reference to Formite Products should in future be addressed to Messrs. Pinchin, Johnson and Co., Ltd., Insulating Varnish Department, 26-27, Bevis Marks, St. Mary Axe, E.C.

B.E.A.M.A. Membership.—The B.E.A.M.A. announces that the following firms have been elected members of the Association:—

Adamson, Daniel & Co., Ltd., Manchester; Andrews, Cuthbert, London; Benjamin Electric Co., Ltd., London; Burnley Ironworks Co., Ltd., Burnley; Butt, Fredk. R. & Co., Ltd., London; Cambridge Scientific Instrument Co., Ltd., Cambridge; Cavendish Electrical Co., Ltd., London; Cossor, A. C., Ltd., London; Cox, Harry W., & Co., Ltd., London; Creed & Co., Ltd., Croydon; Davey, Paxman & Co., Ltd., London; Dean, A. E., & Co., London; Douglas & Grant, Ltd., Kirkcaldy; Gent & Co., Ltd., Leicester; Greville, Ernest, London; Hatbolt, Davey & Co., Ltd., Leeds; Heenan & Froude, Ltd., Manchester; Macfarlane Engineering Co., Ltd., Cathcart; Micanite & Insulators, Ltd., London; Newton & Wright, Ltd., London; Newtons, Ltd., Taunton; Pinchin, Johnson & Co., Ltd., London; Pirelli General Cable Works, Ltd., London; Reid Brothers, Engineers, Ltd., London; Roberts, Wm., & Sons, Ltd., Nelson, Lancs; Saxon, George, Ltd., Manchester; Schall & Schall, London; Siemens Electric Motors, Ltd., Beckenham; Submersible & J. L. Mottis, Ltd., Southall; Timson & Thompson, Ltd., Oldham; Wood Brothers, Sowerby Bridge.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27, 1914.	Cash, July 12, or previous	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt....	—	67	76½	76½
2/9	2/9	Anglo-Argentine 5% 1st Pref.	5	4⅞	55/-	58/9
4%	4%	Do. 4% Deb. ...	100	91	68½	67½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74
5%	5%	Do. 5% Deb. ...	100	96	68	68½
1/-	7d.	Auckland Elec. Trams. Ord....	1	1⅝	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	91⅞	91⅞
7%	7%	Barcelona Trac. 7% 50 yr. Pr. Lien	100	—	103½	103½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref....	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77½	77½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord.	$100	66	48¾	48¼
$1½	$1½	Do. 6% Cum. Pref. ...	$100	97	90	90
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅞	6⅞
2/6	2/6	Do. 5% Cum. Pref.	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	101½	91½	94½
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	29	28
6%	5%	Do. Pref. Ord.	100	106	31½	31½
5%	5%	Do. 5% Cum. Pref. ...	100	103	56	55
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	86½	86½
4½%	4½%	Do. 4½% Perp. Con. Deb ...	100	96½	57	57
£3*	£3*	Brit. Elec. Trac. Ord. ...	100	—	29½	29
6%	6%	Do. 6% Cum. Part. Pref....	100	—	72½	72
5%	5%	Do. 5% Deb.	100	92	76½	75
4½%	4½%	Do. 4½% 2nd Deb....	100	77½	66	65
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	80	80
3/-	6/6*	Calcutta Tramways Ord. ...	5	7½	6⅝	6¾
1/3	1/3	City of B.A. Trams.	5	5½	81/10½	81/3
5/-	4/-	Dublin United Trams. Ord. ...	10	8	7⅜	7⅜
6/-	6/-	Do. 6% Pref.	10	12	10⅜	10⅜
5%	5%	Hong Kong Trams. 5% Mt. Debs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	19/9	19/9
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord. ...	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams. Co. ...	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trams 5% Mt. Debs	100	95	79½	79½
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	Lond. & Sub. Traction Ord....	1	1⅛	1/6	1/10½
6d.	6d.	Do. 5% Pref.	1	1/16	7/-	6/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64½	64½
4½%	4½%	L.G.O. 4½% 1st Deb. ...	100	100	81	80½
5%	5%	Do. 5% Inc. Deb.	100	88½	79	78½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	34	33½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅞	85/-	85/-
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	70	70
$1½	$1½	Manila Elec. R. R. & Light...	$100	102	64½	64½
4½%	4½%	Met. Elec. Trams. 4½% Deb.	100	85½	69	71
$1½	$1½	Mexico Trams. Common ...	$100	70	23	23
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	38	38
6%	6%	Do. 6% Mt. Bds.... ...	100	76	29½	29½
4½%	4½%	Montreal St. 4½% Stg. Dbs (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ...	100	99	92	92
1/2¾*	2/-	National Steam Car	1	1⅝	19/3	19/9
9¾d.*	9¾d.*	New General Traction ...	1	¾	7/3	7/3
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	8¾	13/3½	13/3½
5/-*	6/-*	Para Elec. Rlys. Ord.	5	4½	75/-	73/1½
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80¾	80¾
6d.	6d.	Potteries Elec. Trams. 5% Pref.	1	13/16	10/7½	10/7½
1/4	8d.	Provincial Trams. Ord. ...	1	⅝	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. ... 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	87	85½
5%	5%	1st Mt. 5% 50 yr.	100	89½	76½	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ...	100	99½	74	74½
3d.	3d.	Singapore Elec. Trams. ...	5/-	½	5/-	5/3
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93½	93½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	79
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	69	69
—	—	Yorks. (W.R.) Elec. Trams. Ord.	5	½	17/-	17/-
3/-	3/-	Do. 6% Cum. Pref. ...	5	½	84/6	84/6
—	—	Metropolitan Dist. Ord. ...	100	21½	16	16½
—	—	Undgd. Elec. Rys. of London...	10	21½	33/9	35/9
		Do. "A"	1/-	½	5/4½	5/7½
4½%	4½%	Do. 4½% Bds. of 1933 Rd....	—	99	99½	99½
6%	6%	Do. 6% 1st Cum. In. Db....	100	114	99½	99½
6%	4%	Do. 6% In. Bonds Rd. ...	—	88½	84	83½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

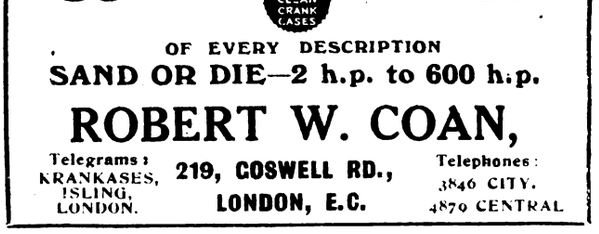
FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915-16	1916-17	Aggregate. Wks.	1916-17	Increase or Dec.
Anglo-Argentine ...	July 8	£51,679	£50,782	27	£1,387,841	+ £10,103
Auckland ... (29 days)	June 30	21,705	23,593	52	282,694	+ 7,031
Ballarat and Bendigo ...	Apr. 22	3,727	3,611	4	4,611	- 884
Brazilian Traction Mlrs.	May	7,304,000	7,864,000	21	37,004,000	+ 3,003,000
Brisbane	June	31,390	32,475	26	193,595	+ 755
British Columbia ... $	May	414,215	438,919	47	4,952,727	+ 290,427
Buenos Aires Lacroze ...	June	36,213	38,020	52	464,077	+ 25,457
Burmah Tram. & Light Rs	May	23,585	24,906	44	257,416	+ 27,698
Calcutta ... Rs.	July 7	70,941	67,558	27	1,817,990	- 16,457
Cape Town	May	...	15,807	21	84,829	...
Carthagena & Herrerias	June	3,512	5,325	26	24,172	+ 7,803
Cordoba	May	14,869	13,735	9	27,395	- 1,546
Costa Rica	Feb.	3,500	2,903	...	...	...
East India	June	2,285	1,186	48	20,526	+ 2,824
Hong Kong $ 10 Mar. to	May 12	138,638	123,523	19	250,253	- 4,574
Kalgoorlie	Mar.	2,479	2,772	13	7,396	+ 433
La Plata	June	3,735	3,852	26	25,144	- 781
Lima	Apr.	33,542	37,807	17	67,785	+ 3,684
Lisbon ... ... Escu.	May	...	233,765	...	...	...
Madras ... (2 weeks) Rs.	June 30	29,250	32,492	26	408,416	- 38,074
Manila ... ... $	May	53,900	61,500	...	...	...
Manaos ... ... Rs.	Mar.	...	161,156	...	...	...
Melbourne	Mar.	63,000	64,506	13	186,321	- 9,179
Montevideo	June	25,300	27,458	35	242,796	- 1,728
Pernambuco	July 7	3,104	4,201	26	98,956	+ 18,866
Peruvian ... $	June	929,590	965,420	52	11,128,092	+ 1,364,595
Port Elizabeth ...	May	...	3,494	21	19,877	...
Rangoon	June	4,205	4,383	26	29,620	+ 1,039
Shanghai ... $	Apr. 25	25,305	12,610	...	...	...
Singapore ... $	May 26	11,992	12,454	21	275,304	- 16,053
Toronto ... ... $	May	903,924	992,460	21	4,889,055	- 438,347
Winnipeg	May	276,980	259,794	21	1,419,144	- 27,644

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Wks.	Aggregate. 1917.	Incr. or Dec.
Aberdare U.D.C. ...	July 3	364	415	- 51	13	£5,648	+ £509
Aberdeen Corporation ...	" 4	1,908	2,293	+ 385	5	10,968	+ 1,746
Accrington Corp. ...	*	...	...	...	...	...	...
Ayr Corporation ...	" 7	470	595	+ 125	8	3,464	+ 357
Belfast City	" 6	5,580	6,558	+ 978	14	84,996	+ 6,701
Birkenhead Corp. ...	" 8	1,612	1,955	+ 343	14½	24,754	+ 3,248
Birmingham Corp. ...	June 30	16,322	17,511	+ 1,189	13	228,460	+ 13,504
Do. Motor Omnibuses	" 30	970	896	- 74	13	11,527	- 775
Blackburn Corp. ...	July 4	1,207	1,618	+ 411	14⅜	21,218	+ 2,697
Blackpool & Fleetwood	June 30	892	986	+ 94	25	12,850	- 572
Blackpool Corp. ...	*	...	...	...	...	...	...
Bolton Corporation ...	July 8	2,914	4,065	+ 1,150	14	46,381	+ 4,724
Bournemouth Corp. ...	" 11	2,179	2,479	+ 300	14⅜	33,415	+ 652
Bradford Corporation ..	" 7	6,859	8,098	+ 1,239	14	105,660	+ 9,400
Brighton Corporation ..	" 8	1,328	1,528	- 200	14⅜	19,025	+ 2,407
Bristol	" 6	5,076	6,118	+ 1,042	26	137,324	+ 10,531
British Elec. Federation	*	...	...	...	...	...	...
Burnley Corporation ...	" 7	1,665	1,981	+ 316	...	...	...
Burton-on-Trent Corp.	" 8	286	306	- 20	24	3,975	+ 241
Bury Corporation ...	" 8	1,505	1,982	+ 477	14½	23,507	+ 2,500
Cardiff Corporation ...	*	...	...	...	...	...	...
Chatham & District ...	" 5	1,341	1,416	+ 75	27	33,037	+ 2,165
Chesterfield Corp. ...	*	...	...	...	...	...	...
Colne Corporation ...	*	...	...	...	...	...	...
Cork Electric	" 5	581	671	+ 90	27	13,780	+ 783
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation ...	June 30	1,114	1,168	+ 53	13	14,963	+ 13
Dover Corporation ...	*	...	...	...	...	...	...
Dublin & Lucan	" 15	179	198	- 19	24	3,404	+ 396
Dublin United... ...	July 6	6,464	8,130	+ 1,666	27	172,106	+ 20,851
Dundee City	" 4	1,359	1,557	+ 198	7½	10,877	+ 944
East Ham Corporation	" 7	1,398	1,452	+ 54	14	20,052	+ 1,543
Exeter Corporation ...	" 6	405	435	+ 30	14	5,354	+ 27
Glasgow Corporation ...	" 7	22,157	27,144	+ 4,987	53	146,163	+ 21,022
Glasgow Subway	*	...	...	...	...	...	...
Glossop (U.Elec Supp.)	" 7	139	172	+ 33	27	3,790	+ 186
Halifax Corporation ...	" 3	2,275	2,689	+ 414	13⅜	32,894	+ 2,007
Do. Motor Omnibuses	" 3	49	47	- 2	13⅜	578	- 64
Hastings & District ...	" 8	1,131	1,352	+ 221	27	28,282	+ 4,703
Huddersfield Corp. ...	" 7	2,974	3,536	+ 562	14	45,189	+ 3,655
Hull Corporation ...	" 7	3,234	3,460	+ 225	19	47,484	+ 3,522
Ilford U.D.C.	" 7	718	809	+ 91	14	10,562	+ 853
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	" 7	677	731	- 54	14	8,736	+ 1,156
Isle of Thanet... ...	" 7	445	377	- 68	40	11,081	- 219
Kilmarnock Corp. ...	" 7	176	215	+ 39	7½	1,406	+ 97
Lanarkshire	" 5	2,371	3,139	+ 768	27	70,008	+ 10,297
Lancashire United ...	" 4	2,054	3,331	+ 1,277	27	56,413	+ 10,290
Leeds City	" 7	10,074	11,835	+ 1,761	14	152,696	+ 16,752
Leicester Corporation...	*	...	...	...	...	...	...
Leith Corporation ...	" 7	852	1,102	+ 250	7½	7,991	+ 1,469
Leyton U.D.C. ...	" 5	1,738	1,934	+ 196	14	26,653	+ 3,572
Liverpool Corporation ...	" 7	14,866	17,375	+ 2,509	26⅜	400,533	+ 32,760
Llandudno & Colwyn Bay	" 6	448	433	- 15	31½	7,679	- 633
London County Council ...	" 11	49,514	55,088	+ 5,574	14½	797,287	+ 98,137
London Genl. Omnibus...	*	...	...	...	...	...	...
London United... ...	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation ...	" 5	246	272	+ 26	14	3,261	+ 238
Manchester Corp.	" 7	19,320	20,234	+ 914	14	284,017	+ 19,434
Met. Elec. Trays. ...	*	...	...	...	...	...	...
National Steam Car ...	*	...	...	...	...	...	...
Nelson Corporation ...	June 23	203	219	+ 16	12	2,740	+ 75
N'castle-on-Tyne Corp.	July 7	6,992	7,644	+ 652	14	106,427	+ 16,809
Newport (Mon. Corp....	*	...	...	...	...	...	...
New St. Helens & Dist.	" 4	1,081	2,017	+ 936	1	2,017	+ 936
Northampton Corp. ...	" 6	716	834	+ 118	14	11,003	- 1,253
Nottingham Corp. ...	" 5	3,852	4,500	+ 648	14	58,062	+ 4,832
Oldham Corporation	" 8	2,460	2,922	+ 462	15	42,088	+ 3,948
Portsmouth Corp. ...	" 7	3,042	3,429	+ 387	...	...	...
Preston Corporation ...	" 4	1,091	1,215	+ 124	13⅜	15,888	+ 958
Provincial	" 7	2,684	2,808	+ 124	40	86,252	+ 167
Reading Corporation ...	" 5	847	1,064	+ 217	13⅜	13,535	+ 2,227
Rhondda Tramways ...	" 5	1,304	1,624	+ 320	27	38,324	+ 5,531
Rochdale Corporation...	" 7	1,811	2,338	+ 527	14	29,171	+ 3,257
Rotherham Corp. ...	" 4	1,571	1,774	+ 203	13⅜	23,521	+ 3,965
Salford Corporation ...	" 9	5,759	7,038	+ 1,279	14⅜	92,828	+ 13,711
Sheffield Corporation ...	" 8	10,828	12,211	+ 1,383	15	174,611	+ 19,168
Southampton Corp. ...	" 4	1,716	2,049	+ 333	13⅜	25,634	+ 3,792
Southend-on-Sea Corp.	" 4	960	1,057	- 97	14	12,450	+ 1,254
South Met. Trays. ...	*	...	...	...	...	...	...
South Shields Corp. ...	" 7	849	951	+ 102	14	12,972	+ 1,848
Sunderland Corp. ...	" 8	1,645	1,783	+ 138	14	24,652	+ 2,263
Sunderland District ...	" 4	592	809	+ 217	36	24,134	+ 3,258
Swindon Corporation ...	" 4	193	271	+ 78	13⅜	3,574	+ 888
Torquay Tramways ...	" 5	623	704	+ 81	27	14,472	+ 1,091
Tyneside Trys. & Ferds.	June 27	629	1,145	+ 516	26	19,012	+ 5,041
Wallasey Corporation ...	July 7	1,471	1,829	+ 358	14⅜	20,833	+ 1,843
Walsall Corporation ...	" 7	827	976	+ 149	14	13,022	+ 1,224
Walthamstow U.D.	" 7	1,158	1,354	+ 196	14	17,582	+ 2,453
Warrington Corp. ...	" 7	466	533	+ 67	10	4,825	+ 230
West Ham Corporation...	" 5	3,322	3,732	+ 410	13⅜	50,889	+ 5,599
Wigan Corporation ...	June 21	1,654	1,921	+ 267	3	22,370	+ 2,447
Yorkshire (W. Riding)...	July 8	1,783	2,326	+ 543	27	53,985	+ 8,383

* Issue of Traffic Returns suspended during the War.



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TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

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THE

Tramway & Railway World

Vol. XLII. No. 4] LONDON, SATURDAY, JULY 21, 1917. [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2

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WEEKLY LIST OF TENDERS INVITED.

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ELECTRICITY DEPARTMENT.

The above Council invite tenders for the following:—

Contract A34.—Two Rotary or Motor Converters.

Contract A35.—4,400 yards 0·05 square inch 3-core E.H.T. (6,600 volt) Cable.

Contract A36.—3,600 yards 2-way Stoneware Conduit.

Copies of specifications and forms of tender may be had on application to Mr. Arthur H. Shaw, M.I.E.E., M.I.Mech.E., Electricity Works, Ilford.

Sealed tenders, endorsed "Tender for Contract A," must be delivered to me on or before 12 o'clock noon on Tuesday, 31st July, 1917.

The Council do not bind themselves to accept the lowest or any tender.

By order,
ADAM PARTINGTON,
Clerk of the Council.

Town Hall, Ilford,
July 17, 1917.

POSITIONS VACANT.

COUNTY BOROUGH OF DARLINGTON.

ENGINEER-IN-CHARGE AND SENIOR SWITCHBOARD ATTENDANT.

Applications are invited for the positions of Engineer-in-Charge and Senior Switchboard Attendant at the Darlington Corporation Electricity Works for the period of the war. Salary, including War Bonus, Engineer-in-Charge, £2 15s. per week, and Senior Switchboard Attendant £2 per week.

Applicants must have had experience with E.H.T. three-phase and D.C. generating plant, and in the case of the position of Engineer-in-Charge mains experience is desirable. Applicants must not be eligible for military service.

Applications, giving age and particulars of experience, etc., and enclosing testimonials, should be sent to the Borough Electrical Engineer, Haughton Road, Darlington, not later than July 30, 1917.

H. G. STEAVENSON,
Town Clerk,
Darlington.

July 17, 1917.

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SCHOOL OF TECHNOLOGY

(UNIVERSITY OF MANCHESTER).

PRINCIPAL: J. C. M. GARNETT, M.A. (late Fellow of Trinity College, Cambridge).

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PRINTING AND PHOTOGRAPHIC TECHNOLOGY,
MINING,
ARCHITECTURE.

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SATURDAY, JULY 21, 1917.

WOMEN IN TRAMWAY EMPLOYMENT.

Some difference of opinion was made manifest in the discussion on the employment of women as car drivers and conductors which took place at the recent conference of the Tramways and Light Railways Association. In some towns women have apparently done well as conductors; it is only in comparatively few places that they are employed as drivers, and in the latter capacity favourable circumstances and careful training are highly essential. Though one or two towns are getting along fairly well with a proportion of female drivers, the calls on physical strength and presence of mind are such that only unavoidable circumstances can justify their employment. The demands on a woman conductor are not so severe, but she must have exceptional powers of endurance to enable her, day in and day out, to carry out the duties with punctuality and regularity. When, earlier in the war, the necessity arose for employing women in place of men as conductors, we expressed the view that such a course could only be justified if it was absolutely unavoidable. Experience has confirmed that opinion. It is probably not too much to say that there is not a tramway manager in the country who will not feel a sense of relief when, on the return of peace, it becomes practicable to release every woman conductor in his employ. Every one appreciates the feelings of patriotism and duty which have animated so many women in taking up the work; but the fact is that some inherent qualities and a lack of long disciplinary training make it impossible, with very few exceptions, for a woman to be as good a conductor as a man is. Very often the class of woman who undertakes this work has not been accustomed to discipline. Therefore, after the first enthusiasm has cooled off, defects appear. She is apt to behave in a way which a disciplined man would not dream of. Sometimes there is discourtesy and a lack of self-control in dealing with passengers; frequently there is a surprising want of care in seeing that passengers are safely aboard or safely off before re-starting the car; and, again, there are delays through inattention or a tendency to carry on conversation. There are, of course, exceptions, and some women have made very good conductors, but the drawbacks are in many cases inherent. There can be no doubt, too, that women become over-fatigued when on a big car on a busy route, and such fatigue is good neither for themselves nor for their treatment of the passengers. Taking these things into consideration, it is plain that the manager cannot bring about improvement by applying discipline as he would in the case of men. The conductresses are women, and in the second place they have volunteered to take up an arduous employment to fill gaps caused by men joining the forces. There is, indeed, much ground for sympathy with the women; many of them in fact find the work so trying that they have to give it up. The work is indeed thoroughly unsuitable for them. In some occupations it is likely that women will continue to be much more largely employed than they were before the war, but it is not probable that acting either as tramcar drivers or conductors will be among the number.

LABOUR DISPUTES.

A deputation consisting of the president and secretary of the Tramway and Vehicle Workers' Association, the president of the Lancashire District Council, and the secretary of the Lancashire and Cheshire District Council, waited upon Sir D. Shackleton, at Montagu House, Westminster, on July 16, as to the disinclination of the Committee on Production to receive them with the Manchester employers and employees. The deputation claimed that there were no special conditions entitling the Manchester tramway workers to a larger war bonus than the 2s. 6d. conceded to similar workers in Lancashire and Cheshire, and that if Manchester's case was heard the conditions attaching to their demand should also be reviewed by Sir George Askwith and his colleagues. The object of the Manchester deputation to Sir G. Askwith was to secure an advance on the previous war bonus of 2s. 6d., and to obtain uniformity of payment. The Lancashire and Cheshire representatives felt that the questions involved were of such a nature that they ought to be heard with the deputation.

The re-opening of the arbitration as regards Manchester took place at 6 p.m. on July 16 by Sir George Askwith, sitting at Old Palace Yard, Whitehall. The Committee issued their decision on Thursday evening stating that there was no reason for a departure from the award of June 11. This award increased the existing war wage advances from 6s. 6d. to 9s. a week for adult men and from 3s. 6d. to 6s. a week for adult women. It was accepted by the employees of a score of the tramway undertakings concerned, but the Manchester workers claimed 7s. 6d. a week more on the ground that the cost of living is higher in the city and the conditions of work more strenuous than in most of the smaller towns. By a "go-easy" strike they secured the reopening of their case on Monday, though this was opposed by the national organisation—and its Lancashire and Cheshire District Committee,—of which they are members. The terms of reference agreed upon were "Difficulties relative to the advances given in the finding of the Committee on Production issued June 11, having regard to any special conditions that may operate in Manchester."

A STRIKE AT BURNLEY.

Owing to a local dispute between the men's unions a strike of the drivers and conductors on the Burnley Corporation tramways was suddenly declared on Saturday, July 14. The strike appears to have taken place at exactly the time when it would subject the public to the greatest possible inconvenience. Holiday makers were returning home on that day, which was the last day of the general vacation, and they were obliged to walk from the station carrying their luggage. The annual fair was moreover in full swing, and the Burnley Fair Saturday is the busiest day of the year. A meeting of the tramway workers was held on Saturday night but there was no change in the situation on Sunday. On Monday only one or two morning workmen's cars were run by inspectors and there was no ordinary service. The General Manager issued a notice, pointing out that the action of the strikers was contrary to the understanding arrived at between the executive committee of the Tramways and Vehicle Workers' Union and representatives of the tramway authorities of Lancashire and Cheshire. Mr. Mozley also pointed out that the tramway men were acting without the sanction of their headquarters staff, and stated that no complaints or requests have been made to the Burnley Corporation with reference to their present action. On June 17 the Council in committee passed a resolution giving the strikers notice that unless they resumed work on or before the 19th, by 12 o'clock noon, they would no longer be considered to be employed by the Corporation, and must forthwith return to the tramways depot all property of the Burnley Corporation in their possession.

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LONDON TRAMWAY ACCOUNTS.

At the fortnightly meeting of the London County Council on Tuesday the Highways Committee submitted the accounts for the year ended March 31, 1917, together with a report by the General Manager on the working of the undertaking.

The tramways system on March 31, 1917, extended over a total length of 149 street miles, of which 144¼ miles were electric lines and 4.6 miles disused horse lines. During the year the only construction work undertaken was the doubling of certain portions of single line in Woolwich.

The following tables give the total income from the undertaking during the year, and the working expenses compared with the results in the three preceding years are given below.

	1916–17	1915–16	1914–15	1913–14
	£	£	£	£
Income	2,552,203	2,339,291	2,399,487	2,268,669
Working expenses* ...	1,817,694	1,683,660	1,700,212	1,615,407
Surplus on working ...	734,509	655,631	699,275	653,202
Deductions—				
Debt charges—				
Interest	314,164	326,477	330,300	—
Redemption	429,851	425,908	405,605	—
	744,015	752,385	735,905	736,602
Rent drawbacks, etc. ...	7,551	6,797	1	—
Income tax	73,000	40 000	32,102	28,197
Parliamentary expenses ...	18	2,200	2,803	2,082
Amount due to Metropolitan Electric Tramways, Ltd., under through-running agreements ...	1,521	—	—	—
	826,112	801,442	770,811	766,881
Less tax deducted, interest on cash balances, rents, etc.	102,945	72,061	38,363	25,153
Total deductions from surplus	723,167	729,420	732,448	741,728
Balance	£11,342 (Surplus)	73,795 (Deficiency)	33,173 (Deficiency)	88,526 (Deficiency)

* Includes war service allowances, 1916-17, £110,155; 1915-16, £95,365; 1914-15, £42,209.

The renewals fund amounted on March 31, 1917, to £282,978 0s. 5d. Previous to the year under review there has been no payment into this fund since the year 1912–13, except interest paid on investments and amounts received from the London United Tramways, Ltd. The general reserve fund on March 31, 1917, amounted to £72,390 10s. 9d. In the case of both funds the balances stated take no account of the depreciation of investments. Operating expenses were £1,694,609 6s. 9d. (excluding war service allowances of £110,155 12s. 10d. and certain special charges amounting to £12,928 19s. 9d.). The total number of passengers carried during the year was 586,127,976, and the number of car miles run was 49,478,973. The corresponding figures for 1915–16 were 545,423,397 and 47,879,675.

The following table gives particulars of the length of electric track open and receipts for the eleven years ended March 31, 1917.

Year ended March 31.	Average track miles.	Average receipts per track mile.	Gross passenger receipts.
		£	£
1907 ...	40.66	19,929	810,320
1908 ...	61.91	20,223	1,252,001
1909 ...	77.94	19,752	1,539,434
1910 ...	99.61	18,546	1,847,327
1911 ...	116.98	17,925	2,096,914
1912 ...	127.55	17,498	2,231,902
1913 ...	132.49	16,179	2,143,559
1914 ...	136.62	15,967	2,181,344
1915 ...	140.66	16,516	2,323,130
1916 ...	141.52	16,097	2,278,115
1917 ...	141.67	17,479	2,476,309

CAPITAL EXPENDITURE.

Capital expenditure on the undertaking up to March 31, 1917, amounted to £13,570,119 1s. 11d., of which £53,542 4s. 4d. was incurred in the year 1916-17. The total amount of the debt incurred was £13,930,659 17s. 7d. The net debt on March 31, 1917, *i.e.*, the debt outstanding, less the sinking fund in hand, and less £120,216 in respect of the value of surplus land was £9,141,826 6s. 8d.

The amount of capital expenditure, which up to March 31, 1917, had become obsolete owing to the electrification of horse tramways, was £2,024,687 15s. 3d. The amount still to be provided for in respect of the debt under this head is £943,740 15s. Certain other expenditure amounting to £117,829 15s. 4d. incurred in connection with electric traction, has also been rendered obsolete.

RATES AND STREET WIDENINGS.

The sum paid as rates on the permanent way amounted in 1916-17 to £64,413 7s. 10d., and represents an average relief to the rates of London of about ¼d. in the £. The saving to the road authorities in consequence of the obligation of the Council to maintain the paving along the tramway routes is estimated by the Council's officers at about £140,000 a year on the present mileage. The amount chargeable to the tramways account in respect of the cost of effecting street improvements up to March 31 last was £774,039 12s. 7d.

The amount actually charged to the tramways account during the year 1916-17 in respect of rates on tracks (£64,413) and street widenings (£36,044), together with the estimated saving to local authorities on maintenance of paving (£140,000) gives a total of £240,457, and various local rates were therefore relieved to this extent.

ANNUAL ESTIMATES 1917-18.

In their original estimates for the year 1917-18 the Highways Committee anticipated that the traffic receipts would be £2,462,500. Owing to changes which have since been made the Committee now anticipate that the traffic receipts will be increased by about £208,000. Additional war bonuses will entail an estimated cost of £90,000 and additional charges for storage and freight of coal £35,000. To provide for this and other expenditure the amount of £40,000 provided for contingencies in the original estimates has been increased to £150,000. The net result of these changes shows an estimated surplus of £8,598 on revenue account instead of a deficiency of £89,402 as previously estimated. The Finance Committee, reporting on the estimates remarked that the conditions under which the tramways are being worked during the war are so exceptional that an artificial state of affairs has been produced which affords no indication of what may prevail after the war.

The reports submitting accounts and estimates were adopted without discussion.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council, the last before the summer recess, the Highways Committee submitted a number of reports, including the report for the year ended March 31, 1917, and the estimates for the following year, which are summarised above.

TENDERS.

On the recommendation of the Highways Committee the Council decided to invite tenders from selected firms for the supply of 3,880 yards of electric cable.

Tenders for the supply of driving wheel and pony wheel tires will be received on July 23, and the Highways Committee were authorised to open the tenders.

Tenders for the supply of iron and steel castings for the tramway department will also be received on July 24, and the Stores and Contracts Committee have been authorised to open these tenders.

EXTENSION OF TIME FOR CONSTRUCTION.

It was resolved that application be made to the Board of Trade for an extension of the time allowed for the construction of various tramways authorised by the London County Council (Tramways and Improvements) Acts, 1903, 1908, 1909 and 1910, which would expire in August, 1918.

FARE CHANGES AND WORKMEN'S TICKETS.

The Highways Committee reported that they had agreed to further recommendations of the Special Sub-Committee on Tramways Operation providing for the issue of transfer tickets only where there are no direct services, and that the transfer tickets should be available for change of cars at specified points only. The ordinary fares would be charged on all-night cars scheduled to arrive at or leave the termini up to 3.30 a.m., and workmen's fares would be charged on all cars scheduled to leave and arrive at the termini from 3.30 a.m. up to the usual hour of availability. Workmen's tickets on all-night cars on down journeys are to commence at 3 a.m. instead of 3.30 from the central termini.

The resolution of the Council of May 3, fixing workmen's fares at 1*d.* for a single journey and 2*d.* for the return or double journey, provides that the 2*d.* ticket shall be available for the return journey or for a single journey "by any car and on any route." This has been interpreted as entitling the workman to a choice of routes where a choice exists. Since 1904 the development of the tramways system has greatly increased the number of possible alternative routes for tramway passengers, and it has become extremely difficult to maintain satisfactory oversight of workmen's return traffic. Consequently it has been decided that in future a workman's ticket will only be valid for the return journey over the same section of tramway as that on which it was issued for the first journey.

All tramway reports were eventually adopted, but there were prolonged discussions on the recommendations of the Highways Committee in regard to changes in workmen's tickets and fares.

Lancashire and Yorkshire Railway Electrification.—The work of converting the Bury-Holcombe Brook line of the Lancashire and Yorkshire Railway has been commenced. The system of electric traction will be the same as that in use on the Manchester-Bury section, which was fully described in "The Tramway and Railway World" of January 13, 1916.

A New Route at Liverpool.—The General Manager, Mr. C. W. Mallins, reported to the Tramways Committee on July 13 that the new circular route to Anfield and Everton had been opened on the previous day.

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MISCELLANEOUS NEWS AND NOTES.

A Sheffield Tramway Depot.—Sir William Clegg, chairman of the Tramways Committee, announced at a recent meeting that the Ministry of Munitions will probably acquire the Nether Edge depot.

Extensions at Newport.—Newport Electricity and Tramways Committee on Tuesday accepted tenders, amounting to about £7,000, for the extension of the power station.

Municipal Tramways Association.—The Council of the Municipal Tramways Association has decided that the annual conference shall be held at Blackpool in September. For the past three years the conference has met in London.

U.S.A. Steel Makers and the War.—The President of the U.S.A. has accepted a combined offer of the principal steel manufacturers to place their plants at the disposal of the Government. Prices will be fixed for all materials from these works.

Northampton Tramway Fares.—The Northampton Tramway Committee propose to recommend the Council to make certain increases in fares. Unless this is done it will be impossible to meet the expenditure, and a tramway rate will have to be enforced.

Rotherham Electricity Supply.—The Board of Trade, after an inquiry, has granted Rotherham Corporation an order to supply electricity in bulk to the Mexborough and Swinton Tramway Company for the period of the war and for twelve months thereafter.

Birmingham Fares.—A deputation from the Birmingham Trades Council recently asked the Tramways Committee for a restoration of the workmen's fares. The committee have promised to review the whole question when peace is restored, but they have declined to recommend the Council to make any change at present.

Stage Numbering.—After a trial extending over some years, the Greenock and Port Glasgow Tramways management has abolished the system of indicating stopping places by numbers on the tickets. The system was confusing to strangers and was never understood by local people. A reversion to the use of street names has been effected.

A Toronto Strike.—There has been a strike of tramway employees in Toronto, and, according to a Reuter's telegram, it has been brought to an end in a drastic way. As the parties failed to reach a compromise, the Provincial Railway Board will take over and work the system, paying the employees an increase of 5 cents an hour.

Penalty for Tramcar Obstruction.—In the North London Police Court the driver of a van was fined 40s. for wilfully obstructing a tramcar on Southgate Road. The defendant was driving a single horse van on the tram lines and ignored the gong sounded by the driver, and for a distance of over a mile retarded the progress of a car, which consequently arrived five minutes late in Ball's Pond Road.

Belfast Overhead Maintenance.—Hitherto the overhead equipment of the tramways has been in the hands of another department, and at the last meeting of the Tramways and Electricity Committee it was proposed that the management and control of the overhead equipment should be transferred to the tramways department. After some discussion the matter was left to a sub-committee for consideration and report.

Workmen's Cars in London.—Workmen's car services are provided by the London County Council from 3.30 a.m. onwards on practically all routes at a fare of 1*d.* single and 2*d.* return. The average length of the workmen's routes is over 5 miles. The longest, from Beckenham Lane to Victoria Station, is 9½ miles, whilst the shortest, from Tower Bridge to Waterloo Station, is 2 miles. A workman may thus travel 19 miles for 2*d.*, a rate which is, of course, utterly indefensible from any point of view.

British Electrical Federation.—The record of the operations of the British Electrical Federation Mutual Aid Fund to June 20 last, which has just been issued, shows that down to that date 2,297 employees of the federated companies had joined the colours. The figure includes 61 members of the salaried staff, but does not include the enlistments from the metropolitan group of companies as those come under the T.O.T. Mutual Aid Scheme. The contributions to the fund to June 20 amounted to £27,770, and the grants to £24,911.

The Result of Halfpenny Fare Suspension.—It is estimated that the suspension of halfpenny fares and return tickets will add £105,000 a year to the gross revenue of the London County Council tramways. If to this greatly delayed rectification of a blunder, recognised at the outset by everyone who had any acquaintance with tramway conditions in London, there could be added such an alteration in workmen's fares as would relieve the undertaking of the loss now entailed, the tramways would be put upon something like a commercial basis.

Dublin and Blessington Tramways.—The President of the Board of Trade, in taking over this undertaking, has decided that the financial situation for the ratepayers shall be as in 1913. In that year they were called on to pay in the County Dublin guaranteeing area a rate of from 3*d.* to 4*d.* in the £, and in the County Wicklow from 4*d.* to 6*d.* For the current year the ratepayers paid in the County Dublin area 2*s.* 4*d.* and in the County Wicklow 3*s.* 6*d.* in the £. Replying to a question by Mr. Clancy in the House of Commons, Mr. Roberts stated that the quantity of petrol used by the Dublin and Blessington Tramway Company had been reduced on June 1 from 1,100 to 734 gallons a month—a reduction of one-third, but as a result of representations the allowance had been increased to 890 gallons.

Railway Electrification after the War.—In his address at the annual meeting of the General Electric Company on July 17 the chairman (Mr. H. Hirst) remarked that many industries on which the country relied would have to modernise their methods and rejuvenate themselves. Electric power, heat and light were primary essentials in such a programme; the depletion of rolling stock in the country would have to be made good, and many of the railway companies would have to prepare for electrification on a large scale.

Fares in Leicester.—The Tramways Committee have further considered the question of revising fares, with the object of increasing the revenue, and their new proposals, which do not go as far as their old ones, are to the following effect: Fares on the Stoneygate, Clarendon Park and Aylestone routes to remain as at present; men in the Services and V.A.D. workers to travel for one halfpenny on all routes; officers to pay full fares; children's tickets to remain at 1*d.*; workmen's return tickets to be raised to 2*d.* for journeys the ordinary single fare for which is 1½*d.*, and to 1½*d.* for return tickets over 1*d.* stages.

Overturned Car at Halifax.—On July 15 a car of the Halifax Corporation tramways was overturned, one passenger being killed and 37 injured. The car was running down Ambler Thorn Hill when it got out of the control of the driver and rushed to the bottom of the hill, a distance of 150 yards. On a curve there it jumped the rails, and after running about 25 yards over the setts was overturned. The driver was practically unhurt, but the conductress received injuries to the head. The car was a new one, and the cause of the accident is at present unknown.

B.T.H. Men at the Front.—In their report for the past year the directors of the British Thomson-Houston Company record the splendid response made by the employees of the company in joining the forces on sea and land. Of these, 152 have fallen in the service of their country, 138 have been wounded, 102 have received commissions, 27 have won special honours, 9 have been mentioned in despatches, and 11 have been specially commended for service in the field. It is proposed at the end of the war to erect a suitable memorial tablet, containing the names of those who have died on active service, as a permanent record of their noble sacrifice.

A Threatened Strike at Exeter.—*The Western Morning News* reports that the Exeter Tramways Committee received some time ago a letter from the divisional organizer of the Workers' Union, threatening to withdraw their members unless the application for an increase in wages was dealt with in a satisfactory manner by July 14. The committee replied that a decision could not be arrived at by the date mentioned. Apparently the ultimatum is standing over for the present. There is said to be much dissatisfaction with the present scale of wages, but it is hoped that the men will take no action until the new manager has had an opportunity of considering the situation.

No Glasgow Tramway Draw.—A deputation from Glasgow Town Council waited on Mr. Munro, Secretary for Scotland, on July 17, and asked that Parliamentary authority should be obtained for continuing the tramway prize drawing scheme for the benefit of funds for wounded sailors and soldiers. Mr. Munro replied, that having regard to the law on lotteries and the recent legislation regarding gaming machines in Scotland, he could hold out no hope of the Government introducing a Bill to legalise the tramway draw. He quite appreciated the motives of the Corporation, but he did not admit that these were strictly relevant to the question of legalising a course which at present was illegal.

The Karrier Motor Ambulance Division were responsible for taking a number of sick and wounded soldiers to Harrogate and back on last Saturday afternoon, July 14, this being the second run which the K.M.A.D. has successfully carried out this year. Owners of commercial lorries and private cars loaned their vehicles for the occasion. The run started from Karrier Works at 1.30 and arrived at Harrogate at 3.30. The return journey from Harrogate commenced at 8.30. Everybody who took part in the outing did his utmost to make the day a thoroughly enjoyable one for the guests. All enjoyed a thoroughly good tea. The Soldiers' Pierrots gave an entertainment. Chocolates and cigarettes were provided from funds specially contributed by the men and girls of Karrier Works.

Cardiff Tramwaymen and the War.—Mr. Arthur Ellis, manager of Cardiff Corporation tramways, has reported that 70 drivers and 121 conductors are now serving with the colours. The tramways are paying £5,000 a year in allowances to employees now in the Army. Sir John Courtis, on behalf of the Cardiff Tramways Committee and of the tramway employees, recently presented a framed photograph and a purse of money to Mrs. Bartlett, the widowed mother of the late Corporal E. Bartlett, who was formerly a Cardiff tramway conductor. Corporal Bartlett won the D.C.M. in France and was killed in action. Three other employees of the Cardiff tramways have won the D.C.M. and two the Military Medal, while one has received an Italian decoration.

Stoppage on Bath Tramways.—The cars of the Bath Tramways Company running to the Great Western Railway station were obstructed for the greater part of an hour on June 9 by a singular accident. A kerosine oil tank of the British Petroleum Company, Ltd., was being drawn along Westgate Buildings by a pair of horses, when in turning to the near side of the road one of the off wheels got in a hollow place between fixed points opposite to the entrance of Chapel Court. This threw a strain on the front axle, with the result that the near fore wheel snapped off the axle. The tank, which contained about 200 gallons of oil, was held up by the strong iron step which gives access to the driver's seat, but it was impossible to move the vehicle. Eventually a low trolley was obtained and placed under the broken axle by means of a jack, and this enabled the tank to be pushed off the tram route.

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Dishonest Passengers.—There is apparently a growing increase in the fares lost by tramways throughout the country owing to the dishonesty of passengers. Mr. Hume, chairman of the London County Council Highways Committee, has said that the Council were losing large sums from this cause. A few days ago Councillor Short, of Portsmouth, in alluding to the matter, observed there were scores of people who rode on their cars and never paid a penny. At Doncaster last week one of these dishonest passengers was detected, and at the police court was fined 20*s.* for leaving the car without paying his proper fare. He had taken a 1*d.* ticket, and having gone beyond his stage refused to pay the extra fare. The attitude of a section of the public is illustrated by the remark of a passenger to a lady conductor—a volunteer during a strike—that she was a "silly" to give him a ticket when she might keep the money. The only remedy appears to be the prosecution of passengers whenever there is unmistakable evidence of dishonest intent. Tramway conductors have sufficient temptation to peculation without being encouraged thereto by the bad example of passengers.

Results of Fares Revision at Walthamstow.—Mr. Wm. Murray, manager of Walthamstow tramways, in his annnal report for the year ended March 31 last, says that since the construction of the tramways the Council had sought to give the cheapest possible travelling facilities and at the same time to make the department self-supporting. They succeeded in the latter ambition in 1910, 1911 and 1912, when the advent of motor omnibus competition gave them a set-back, and it became evident during the succeeding years that some change must be made if the department was to pay its way. When the matter was taken up by the Council in 1915 it was soon realised that nothing could be done effectually to reduce expenses. It was finally decided to abolish halfpenny fares for adult passengers, to discontinue issuing cheap return tickets, and to increase the price of workmen's tickets by 50 per cent. The change has been amply justified by its results. The traffic revenue for the year increased by £9,518, and the net balance was £6,800, as against £816 during the previous twelve months. Both in the abolition of halfpenny fares and in the employment of women Walthamstow gave a lead to the other tramway authorities in Greater London, and now all its near neighbours have followed the example.

PERSONAL.

Mr. J. W. Dawson, assistant electrical engineer of Bradford Corporation tramways, has been granted an increase in salary of £30 per annum.

Mr. William Murphy, chairman of the Dublin United Tramways Company, has been invited by the Government to act as one of their representatives at the Irish Convention, which will meet at Trinity College, Dublin.

Mr. E. A. Prosser, general manager of the Cardiff Railway Company and of the Rhymney Railway Company, has been appointed also general manager of the Taff Vale Railway Company, and it is expected that the working of these lines will be unified.

Mr. Lorenzo W. Migotti, who for the past nine years has been electrical engineer to the Bahia Blanca North Western Railway and manager of the South American Light and Power Company, and who was formerly with the Underground Railways of London, has accepted the post of chief engineer to the Electric Supply Company of Rosario de Santa Fe, Argentine Republic.

Tramway Employees Serving with H.M. Forces.—The Liverpool Tramways Department has been notified of the recent honours conferred for conspicuous bravery in the field on the following tramway employees now serving with H.M. Forces, viz.:—Military Medal: W. N. Fortune, E. Pritchard, J. E. Downes, T. J. Jones and F. Shields, all serving with the Forces in France. Meritorious Service Medal: D. Collum, serving with the Mesopotamian Forces. Nine other employees of the department have received at different times distinctions for bravery in the field, viz.:—Capt. S. Carty, Military Cross and Medal; W. Broster, Military Medal and Distinguished Conduct Medal (killed in action); E. T. Pryce, J. H. Evans and G. J. Lazell, Military Medal; R. Williams and A. R. Jones, Distinguished Conduct Medal; C. F. Claxton, D.C.M. and Military Medal; and T. Muncaster, Meritorious Service Medal. A large number of employees have also been mentioned from time to time by their respective Commanding Officers for conspicuous gallantry.

CONTRACTS AND ORDERS.

Derby Corporation has accepted the tender of the British Thomson Company for a rotary converter and switch gear at £2,314.

The Shoreditch Electricity Committee has recommended the acceptance of the tender of the British Westinghouse Company, Ltd., for turbo-alternator plant at £26,538. Nine tenders were received.

Headingley Tramways, Leeds.—The Corporation have accepted the following tenders for the reconstruction of the tramways in Victoria Road, Headingley, Leeds:—Section 1: J. Speight, tramway work, £508 2*s.* 6*d.*; highway work, £277 18*s.* 4*d.* Section 2—D. Speight and Sons, tramway work, £805 15*s.*; highway work, £277 18*s.* 4*d.*

FINANCIAL REPORTS AND MEETINGS.

North Melbourne Tramways.—The report of the North Melbourne Electric Tramways and Lighting Company, Limited, states that the gross receipts show an increase from £33,462 to £40,358. The expenses—principally due to increased wages and high cost of materials and freight—increased from £21,730 to £28,888, the net revenue therefore being £11,470 as compared with £11,732 for the previous year. A contract has been entered into with the Melbourne City Council for the lighting of Flemington and Kensington. The necessary work of laying the mains and erecting the standards is being proceeded with as rapidly as possible.

Brazilian Traction, Light and Power Company.—The report for the year ended December 31, 1916, states that the surplus available for dividends was 5,674,642 dol. After paying four dividends at 1 per cent. each, there is a surplus carried forward in profit and loss of 823,154 dol. The decline in the surplus, as compared with the year preceding the war, is due to the fall in the exchange value of the milreis. Pending resumption of payment of dividends on the Ordinary Shares, the board propose to apply the surplus revenue from time to time in liquidating the floating indebtedness of the companies and in providing for the necessary capital expenditure.

Improvement at Walthamstow.—The twelfth annual report on the Walthamstow Urban District Council tramways has been presented by the manager, Mr. Wm. Murray. It shows that for the year ended March 31 last the total receipts were £55,770, as compared with £45,874 in the preceding year. The net balance after meeting all expenses, including repayment of loan and interest (£9,909) and war bonus and separation allowances (£1,700), was £6,817, against £816 in 1916. The revenue per car mile was 11.86*d.*, an increase of 1.45*d.* The passengers numbered 12,367,758, a decrease of 2,320,685. The mileage run was 1,128,029, an increase of 69,460. The highly favourable financial results compared with previous years is attributed to the abolition of halfpenny fares, which, on the recommendation of the manager, was carried out at the beginning of the financial year.

British Thomson-Houston Company.—The report of the directors for the year ended December 31, 1916, shows that the profits, after deducting all expenses and charges except interest, amounted to £359,364. Including the balance brought forward of £3,358 and a reserve for raw materials not required and written back of £25,000, there is a balance of £387,722. Interest on debentures and loans requires £70,100, leaving £317,622 to be dealt with. The directors propose to set aside for depreciation £153,699 and to carry forward, subject to deduction of munitions levy for 1916, £163,922. The directors allude with regret to the death of Sir George Franklin, a member of the board for 18 years, and the resignation of Mr. J. F. Nauheim, chairman, who had been a director for 20 years. Mr. E. Thurnauer, who for 21 years has represented the French shareholders, retires from the board. Mr. H. C. Levis, the managing director, has been appointed chairman.

General Electric Company.—Presiding at the annual meeting on July 17, Mr. H. Hirst moved the adoption of the report, a summary of which appeared in our issue of July 14. He said that the total net profit had increased by about £70,000, of which £30,000 was on trading account, and about £40,000 represented increase in revenue from investments. Their investments account, which had shown a steady yield of about 10 per cent., had increased by, roughly, £350,000, due mainly to their acquisition of shares in the Osram-Robertson Lamp Works, Limited, of which in the past they had been only part-owners. He hoped the ordinary shareholders would approve their refunding this year the income tax to preference shareholders by way of a special bonus. The ordinary shareholders were reaping the full benefit of the prosperity of the company by an increased dividend and by the appreciation of their shares. Of all the changes that would result from war in this country those in the electrical industry would be the most drastic. Replacement and

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reorganisation after the war would be a tremendous task for the existing electrical companies. War had taught the country the necessity of home produetion.

Burnley Corporation Tramways.—The report of Mr. H. Mozley, general manager, states that during the year ended March 31, 1917, there was an increase in traffic receipts of £4,064, although the car mileage remained practically the same. Ordinary discount tickets and students' periodical tickets were abolished, but too late to have much influence on the results of the year. Wages showed an increase of more than £4,000 per annum above the amount at the beginning of the war. Within past three years £10,011 have been contributed as allowances to employees with the forces, income tax has increased by £3,000, and there has been a like increase in wages. But for the conditions arising out of the war, the financial position of the undertaking would have been a great advantage to the ratepayers from a profit-earning point of view. The long continuance of the war and the demands of the military authorities continue to affect the staff seriously, but the efficiency of the service is surprising considering the conditions. The following summary gives a comparison of the results for the past five years:—

Year ended March 31.	1917	1916	1915	1914	1913
	£	£	£	£	£
Total revenue ...	87,421	83,238	78,466	88,316	79,890
Working expenses ...	58,604	53,572	55,833	62,948	49,430
War allowances ...	3,211	4,312	2,483	—	—
Profit on working ...	£25,352	£25,606	£20,150	£25,367	£30,460
	£	£	£	£	£
Interest	6,401	6,552	6,797	6,938	5,661
Sinking fund	8,716	8,497	8,284	7,728	6,491
Rent for tramways worked	1,546	1,752	1,889	1,941	2,061
Income tax on profits .	3,720	2,541	1,515	1,072	892
Reserve fund	5,222	—	—	—	5,790
Borough fund	—	6,010	1,604	7,687	8,750
Passengers carried ...	17,068,753	16,946,677	15,867,699	17,068,834	15,949,359
Fare per passenger ...	1.21	1.15	1.16	1.18	1.18
Car mileage ...	1,548,902	1,546,389	1,644,712	1,754,811	1,449,647
Units per car mile ...	2.15	2.06	2.20	2.22	2.11
Power cost per car mile...	2.677	2.786	2.749	2.639	2.556
Traffic receipts per car mile	13.48d.	12.88d.	11.42d.	12.04d.	13.19
Expenses per car mile...	9.08d.	8.31d.	8.15d.	8.62d.	8.18d
Ratio of expenses ...	67.04 p.c.	64.36 p.c.	67 p.c.	71.39	61.85 p.c.
Number of cars in stock	67	67	67	67	57

DIVIDENDS.

Underground Electric Railways.—The directors of the Underground Electric Railways Company of London, Ltd., announce that interest on the Six per Cent. First Cumulative Income Debenture stock will be paid on September 1, less tax, at 3 per cent., and coupon No. 19 off the Six per Cent. Income bonds will be paid, free of tax, at 2 per cent. For the second half of last year the rate was the same.

City and South London.—The directors of the City and South London Railway Company have declared dividends of 2½ per cent. on the Five per Cent. Preference stocks 1891, 1896, 1901 and 1903, and ¾ per cent. on the Ordinary stock for the six months ended June 30. The rate was the same a year ago.

Central London Railway.—The Directors of the Central London Railway Company have declared interim dividends for the six months ended June 30 on the Undivided Ordinary stock of 1¾ per cent. and on the Preferred Ordinary stock of 2 per cent. There is no change in the dividend as compared with the corresponding half of the previous year.

Metropolitan District Railway.—The directors of the Metropolitan District Railway Company have declared interim dividends for the six months ended June 30 on the Four per Cent. Guaranteed stock of 2 per cent., on the First Preference stock of 2¼ per cent., and on the Second Preference stock of 1½ per cent. The dividends are the same as a year ago.

London Electric Railway.—The directors of the London Electric Railway Company have declared a dividend for the past half-year at the rate of 2 per cent. on the Four per Cent. Preference stock and ¾ per cent, on the Ordinary shares. The rates are the same as a year ago.

London General Omnibus.—The directors of the London General Omnibus Company have declared an interim dividend for the half-year ended June 30 of 4 per cent., free of income tax, on the Ordinary shares. A year ago the interim dividend was at 5 per cent.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended July 14 give total receipts of £210,567, or £31,937 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £98 5*s.* 1*d.* per mile of single track, and last year at the rate of £83 7*s.* 1*d.*, thus showing an increase for the week of £14 18*s.* 0*d.* per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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Highways and Permanent Way Engineer, City of Leeds.

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CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.

Patching—Partial repairs—Complete renewal.

CHAPTER IV.—TRACK DESIGN.

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CHAPTER V.—RAIL PACKING.

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CHAPTER VI.—RAIL LAYING.

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DIVIDENDS. Prev.	Last.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH, JULY 19, or previous	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt....	—	67	78	76½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	56/3	55/-
4%	4%	Do. 4% Deb. ...	100	91	68	68½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74½	74
5%	5%	Do. 5% Deb. ...	100	96	68	68
1/-	7d.	Auckland Elec. Trams. Ord....	1	1 5/16	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	91⅞	91⅞
7%	7%	Barcelona Trac. 7% 50 yr. Pr. Lien	100	—	103½	103½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref....	10	11⅜	10	9 27/32
4½%	4½%	Do. 4½% Deb.	100	96	77⅜	77⅜
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord.	$100	66	51⅛	48⅜
$1½	$1½	Do. 6% Cum. Pref. ...	$100	97	90½	90
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅝	6⅝
2/6	2/6	Do. 5% Cum. Pref.	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	101½	91⅞	91⅞
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	30	29
6%	5%	Do. Pref. Ord. ...	100	106	31⅜	31⅜
5%	5%	Do. 5% Cum. Pref.	100	103	54½	56
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	84½	86½
4½%	4½%	Do. 4½% Perp. Con. Deb ...	100	96½	57	57
£3*	£3*	Brit. Elec. Trac. Ord. ...	100	—	29	29½
6%	6%	Do. 6% Cum. Part. Pref....	100	—	72½	72⅝
5%	5%	Do. 5% Deb.	100	92	75½	76⅞
4½%	4½%	Do. 4½% 2nd Deb....	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	80	80
3/-	6/6*	Calcutta Tramways Ord. ...	5	7¼	6⅝	6 9/16
1/3	1/3	City of B.A. Trams.	5	5½	81/10½	81/10½
5/-	4/-	Dublin United Trams. Ord. ...	10	8	7 3/32	7 3/32
6/-	6/-	Do. 6% Pref.	10	12	10 1/4 xd	10⅜
5%	5%	Hong Kong Trams. 5% Mt. Debs.	100	87½	79⅞	79⅞
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	19/9	19/9
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord. ...	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams. Co. ...	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trams 5% Mt. Debs	100	95	79⅝	79⅝
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	Lond. & Sub. Traction Ord....	1	15/64	1/6	1/6
6d.	6d.	Do. 5% Pref.	1	13/64	6/9	7/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	61	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	78⅜	79
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	34½	34
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	85/-	85/-
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	70	70
$1¼	$1¼	Manila Elec. R. R. & Light...	$100	102	64½	64½
4½%	4½%	Met. Elec. Trams. 4½% Deb.	100	85½	70	69
$1½	$1½	Mexico Trams. Common ...	$100	70	24⅞	23
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	37	38
6%	6%	Do. 6% Mt. Bds.... ...	100	76	29⅝	29⅝
4½%	4½%	Montreal St. 4½% Stg. Dbs (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ...	100	99	92	92
1/2½*	2/-	National Steam Car	1	15/32	19/6	19/3
9¾d.*	9¾d.*	New General Traction ...	1	¼	7/3	7/3
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	13/3¾	13/3½
5/-*	6/-*	Para Elec. Rlys. Ord.	5	4½	75/-	75/-
—	—	Pernambuco Try. & Pr. Co. Ord.	—	1	5/10½	5/-
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80¾	80¾
6d.	6d.	Potteries Elec. Trams. 5% Pref.	1	13/32	10/7½	10/7½
1/4	8d.	Provincial Trams. Ord. ...	1	⅝	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. ... 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	86	87
5%	5%	1st Mt. 5% 50 yr.	100	89½	77½	76½
5%	5%	Sao Paulo Deb. 5% 1st Mt....	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ...	100	99½	74⅜	74
3d.	3d.	Singapore Elec. Trams. ...	5/-	¼	5/-	5/-
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93¼	93½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	69	69
—	—	Yorks. (W.R.) Elec. Trams. Ord.	5	⅛	17/-	17/-
3/-	3/-	Do. 6% Cum. Pref. ...	5	⅜	85/-	84/6
—	—	Metropolitan Dist. Ord. ...	100	21½	15½	16
—	—	Undgd. Elec. Rys. of London...	10	21½	34/-	33/9
		Do. "A"	1/-	¾	5/4½	5/4½
4½%	4½%	Do. 4½% Bds. of 1933 Rd....	—	99	99½	99½
6%	6%	Do. 6% 1st Cum. In. Db....	100	114	101	99½
6%	4%	Do. 6% In. Bonds Rd. ...	—	88½	83½	84

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915-16	Latest Return. 1916-17	Aggregate. Wks.	Aggregate. 1916-17	Increase or Dec.
Anglo-Argentine ...	July 15	£54,578	£52,007	28	£1,439,848	+ £7,532
Auckland ... (29 days)	June 30	21,705	23,593	52	282,694	+ 7,931
Ballarat and Bendigo ...	Apr. 22	3,727	4,611	4	4,611	+ 884
Brazilian Traction Mlrs.	May	7,304,000	7,864,000	21	37,004,000	+ 3,003,000
Brisbane	June	31,390	32,475	26	193,595	— 755
British Columbia $	May	414,215	438,919	47	4,952,727	+ 290,427
Buenos Aires Lacroze	June	36,213	38,020	52	464,077	— 25,457
Burmah Tram. & Light Rs	June	24,027	25,463	48	282,879	+ 29,134
Calcutta ... Rs.	July 14	70,546	68,719	28	1,886,709	+ 14,630
Cape Town	May	...	15,867	21	84,829	...
Carthagena & Herrerias	June	3,512	5,325	26	24,172	+ 7,803
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	...	...	...
East India	June	2,285	1,186	48	20,326	— 2,824
Hong Kong $ 10 Mar. to	May 12	138,638	123,523	19	250,253	— 4,574
Kalgoorlie	Mar.	2,479	2,772	13	7,396	+ 433
La Plata	June	3,735	3,852	26	25,144	— 781
Lima	Apr.	33,542	37,807	17	67,785	+ 3,684
Lisbon ... ... Escu.	May	...	233,765	...	...	...
Madras ... (2 weeks) Rs.	June 30	29,250	32,492	26	408,416	+ 38,074
Manila ... ... $	May	53,900	61,500	...	...	...
Manaos ... ... Rs.	Mar.	...	161,156	...	...	...
Melbourne	Mar.	63,000	64,506	13	186,321	— 9,179
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	July 7	3,104	4,201	26	98,956	+ 18,866
Peruvian ... $	June	929,500	965,420	52	11,128,092	+ 1,364,595
Port Elizabeth ...	May	...	3,494	21	19,877	...
Rangoon	June	4,205	4,383	26	29,620	+ 1,039
Shanghai ... $	Apr. 25	25,305	12,610	...	...	...
Singapore ... $	May 26	11,992	12,454	21	275,304	+ 16,053
Toronto ... ... £	May	903,924	992,460	21	4,889,055	+ 438,347
Winnipeg	May	276,980	259,794	21	1,419,144	— 27,644

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1916	Latest Return. 1917	Incr. or Dec.	Wks.	Aggregate. 1917.	Incr. or Dec.
Aberdare U.D.C. ...	July 10	384	462	+ 78	14	£6,109	+ £587
Aberdeen Corporation ...	,, 13	1,841	2,144	+ 303	6	13,112	+ 2,049
Accrington Corp. ...	*	...	...	...	...	...	...
Ayr Corporation ...	,, 14	503	724	+ 220	9	4,189	+ 577
Belfast City	,, 13	5,624	7,183	+ 1,559	15	92,179	+ 8,260
Birkenhead Corp. ...	,, 15	1,531	1,909	+ 378	15½	26,663	+ 3,626
Birmingham Corp. ...	,, 7	16,262	18,863	+ 2,601	14	247,323	+ 16,105
Do. Motor Omnibuses	,, 7	975	1,053	+ 78	14	12,580	— 696
Blackburn Corp. ...	,, 11	1,194	1,592	+ 398	15½	20,367	+ 2,445
Blackpool & Fleetwood	,, 14	1,233	1,559	+ 315	27	16,182	— 56
Blackpool Corp. ...	*	...	...	...	...	...	...
Bolton Corporation ...	,, 15	2,788	3,363	+ 575	15	49,744	+ 5,400
Bournemouth Corp. ...	,, 18	2,411	2,612	+ 201	15½	36,027	+ 853
Bradford Corporation ...	,, 14	6,657	7,995	+ 1,338	15	113,655	+ 10,738
Brighton Corporation ...	,, 15	1,273	1,657	+ 384	15½	20,682	+ 2,791
Bristol	,, 13	5,181	5,650	+ 469	27	142 975	+ 11,001
British Elec. Federation	*	...	...	...	...	...	...
Burnley Corporation ...	,, 14	1,586	1,714	+ 128	...	...	...
Burton-on-Trent Corp.	,, 15	266	306	+ 40	25	4,281	+ 282
Bury Corporation ...	,, 15	1,383	1,697	+ 314	15½	25,204	+ 2,815
Cardiff Corporation ...	*	...	...	...	...	...	...
Chatham & District ...	,, 12	1,343	1,370	+ 27	28	34,407	+ 2,193
Chesterfield Corp. ...	*	...	...	...	...	...	...
Colne Corporation ...	*	...	...	...	...	...	...
Cork Electric	,, 12	542	637	+ 95	28	14,417	+ 873
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation ...	,, 14	1,138	1,218	+ 79	15	17,408	+ 337
Dover Corporation ...	*	...	...	...	...	...	...
Dublin & Lucan ...	June 15	179	198	+ 19	24	3,404	+ 396
Dublin United... ...	July 13	6,628	7,207	+ 579	28	179,314	+ 21,453
Dundee City	,, 11	1,340	1,529	+ 189	8½	12,407	+ 1,140
East Ham Corporation	7	1,398	1,452	+ 54	14	20,052	+ 1,543
Exeter Corporation ...	,, 13	403	435	+ 32	15	5,789	+ 59
Glasgow Corporation ...	,, 14	22,493	26,831	+ 4,338	6⅔	172,995	+ 25,749
Glasgow Subway ...	*	...	...	...	...	...	...
Glossop (U.Elec Supp.)	,, 14	136	169	+ 33	28	3,959	+ 220
Halifax Corporation ...	,, 10	2,226	2,662	+ 436	14⅔	35,556	+ 2,442
Do. Motor Omnibuses	,, 10	48	46	— 2	14⅔	623	— 66
Hastings & District ...	,, 15	1,166	1,487	+ 321	28	29,769	+ 5,114
Huddersfield Corp. ...	,, 14	2,892	3,399	+ 507	15	48,589	+ 4,162
Hull Corporation ...	,, 14	3,279	3,402	+ 122	20	50,887	+ 3,645
Ilford U.D.C.	,, 14	713	752	+ 39	15	11,314	+ 894
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	,, 14	621	682	+ 61	15	9,419	+ 1,186
Isle of Thanet... ...	,, 14	453	363	— 90	40	11,444	— 309
Kilmarnock Corp. ...	,, 14	167	196	+ 29	8½	1,602	+ 126
Lanarkshire	,, 12	2,255	2,902	+ 647	28	72,911	+ 10,944
Lancashire United ...	,, 11	1,844	3,170	+ 1,326	28	59,608	+ 11,526
Leeds City	,, 14	10,006	11,506	+ 1,500	15	164,203	+ 18,275
Leicester Corporation...	*	...	...	...	...	...	...
Leith Corporation ...	,, 14	913	1,125	+ 212	8½	9,117	+ 1,680
Leyton U.D.C.	,, 12	1,762	1,848	+ 86	15	28,501	+ 3,658
Liverpool Corporation	,, 7	14,866	17,375	+ 2,569	26½	400,533	+ 32,760
Llandudno & Colwyn Bay	,, 6	448	433	— 15	31½	7,679	— 633
London County Council	,, 18	48,584	56,543	+ 7,959	15½	854,416	+ 106,681
London Genl. Omnibus...	*	...	...	...	...	...	...
London United... ...	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	,, 12	222	251	+ 29	15	3,512	+ 267
Manchester Corp. ...	,, 14	19,055	20,845	+ 1,790	15	304,862	+ 21,249
Met. Elec. Trays. ...	*	...	...	...	...	...	...
National Steam Car ...	*	...	...	...	...	...	...
Nelson Corporation ...	June 23	203	219	+ 16	12	2,740	+ 75
N'castle-on-Tyne Corp.	July 14	7,129	7,738	+ 609	15	114,165	+ 17,443
Newport (Mon.) Corp....	*	...	...	...	...	...	...
New St. Helens & Dist.	,, 11	1,083	1,778	+ 695	2	2,891	+ 1,078
Northampton Corp. ...	,, 13	695	819	+ 124	15	11,822	+ 1,377
Nottingham Corp. ...	,, 12	3,993	4,485	+ 492	15	62,547	+ 5,324
Oldham Corporation ...	,, 15	2,462	2,955	+ 493	16	45,044	+ 4,441
Portsmouth Corp. ...	,, 14	2,886	3,195	+ 309	...	...	...
Preston Corporation ...	,, 11	1,126	1,184	+ 58	14⅔	17,072	+ 1,015
Provincial	,, 14	2,633	2,757	+ 124	41	89.008	+ 288
Reading Corporation ...	,, 12	875	1,033	+ 158	15	14,569	+ 2,386
Rhondda Tramways ...	,, 12	1,351	1,539	+ 188	28	39,864	+ 5,719
Rochdale Corporation...	,, 14	1,785	2,251	+ 466	15	31,423	+ 3,723
Rotherham Corp. ...	,, 18	1,548	1,826	+ 278	15⅔	27,149	+ 4,453
Salford Corporation ...	,, 16	5,468	6,637	+ 1,169	15⅔	99,465	+ 14,878
Sheffield Corporation ...	,, 15	10,679	12,160	+ 1,481	16	186,772	+ 20,650
Southampton Corp. ...	,, 11	1,657	2,079	+ 422	14⅔	27,713	+ 4,214
Southend-on-Sea Corp.	,, 11	1,010	1,012	+ 2	14	13,462	+ 1,274
South Met. Trays. ...	*	...	...	...	...	...	...
South Shields Corp. ...	,, 14	896	964	+ 68	15	13,936	+ 1,932
Sunderland Corp. ...	,, 15	1,708	1,818	+ 110	15	26,470	+ 2,373
Sunderland District ...	,, 11	601	737	+ 136	37	24,871	+ 3,392
Swindon Corporation ...	,, 4	193	271	+ 78	13⅓	3,574	+ 888
Torquay Tramways ...	,, 12	594	736	+ 142	28	15,209	+ 1,233
Tyneside Trys. & Tmrds.	,, 4	633	1,233	+ 600	27	20,245	+ 5,642
Wallasey Corporation ...	,, 14	1,438	1,932	+ 494	15½	22,765	+ 2,337
Walsall Corporation ...	,, 14	824	947	+ 123	15	13,969	+ 1,348
Walthamstow U.D. ...	,, 14	1,148	1,229	+ 81	15	18,810	+ 2,526
Warrington Corp. ...	,, 7	466	533	+ 67	10	4,825	+ 230
West Ham Corporation...	,, 12	3,346	3,676	+ 330	14⅔	54,565	+ 5,929
Wigan Corporation ...	,, 12	1,669	2,034	+ 365	6	28,370	+ 3,452
Yorkshire (W. Riding)...	,, 15	1,710	2,196	+ 486	28	56,181	+ 8,868

* Issue of Traffic Returns suspended during the War.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

STOCKPORT CORPORATION TRAMWAYS.

ADVERTISING ON CARS.

Tenders are invited for the Advertising Rights, for a period of five years, upon the tramcars of the Corporation running within the County Borough of Stockport and outside districts.

Forms of tender and contract may be obtained on application to the undersigned.

Tenders endorsed "Tramcar Advertising" to be delivered at this office on or before August 25, 1917.

A. T. EARDLEY,
Tramway Manager.

Mersey Square, Stockport.
July 17, 1917.

ILFORD URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The above Council invite tenders for the following:—

Contract A34.—Two Rotary or Motor Converters.

Contract A35.—4,400 yards 0·05 square inch 3-core E.H.T. (6,600 volt) Cable.

Contract A36.—3,600 yards 2-way Stoneware Conduit.

Copies of specifications and forms of tender may be had on application to Mr. Arthur H. Shaw, M.I.E.E., M.I.Mech.E., Electricity Works, Ilford.

Sealed tenders, endorsed "Tender for Contract A," must be delivered to me on or before 12 o'clock noon on Tuesday, 31st July, 1917.

The Council do not bind themselves to accept the lowest or any tender.

By order,
ADAM PARTINGTON,
Clerk of the Council.

Town Hall, Ilford,
July 17, 1917.

FOR SALE.

Lancashire Dynamo Double-ended Booster, 675 r.p.m., each end 370 amps. 30 volts, with regulators and motor starter. Price £200. Purchaser to remove from site.—TRAFFORD POWER CO., LTD., Trafford Park, Manchester.

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(UNIVERSITY OF MANCHESTER).

PRINCIPAL: J. C. M. GARNETT, M.A. (late Fellow of Trinity College, Cambridge.

The Session 1917-18 will open on 5th October. Matriculation and Entrance Examinations will be held in July and September.

The Prospectus, forwarded free on application, gives particulars of the courses leading to the Manchester University degrees in the Faculty of Technology, and of the provision for Advanced Study and Research in the following departments:—

MECHANICAL ENGINEERING,
ELECTRICAL ENGINEERING,
SANITARY ENGINEERING (including Municipal Engineering),
THE CHEMICAL INDUSTRIES (including General Chemical Technology, Bleaching, Dyeing and Dyestuff Manufacture, Printing, Papermaking, Brewing, and Metallurgy),
THE TEXTILE INDUSTRIES,
PRINTING AND PHOTOGRAPHIC TECHNOLOGY,
MINING,
ARCHITECTURE.

Intending students may enrol for the Session 1917-18 from 1st August, 1917. Members of the University under 18 years of age are eligible for membership of the Officers' Training Corps.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

Electric Tramcar Handbook

FOR
MOTORMEN, INSPECTORS,
AND DEPÔT WORKERS.

By W. A. AGNEW.

120 Pages, 7 in. by 4¼ in. Cloth. Price, *1s. 6d.* Postage, *2d.*

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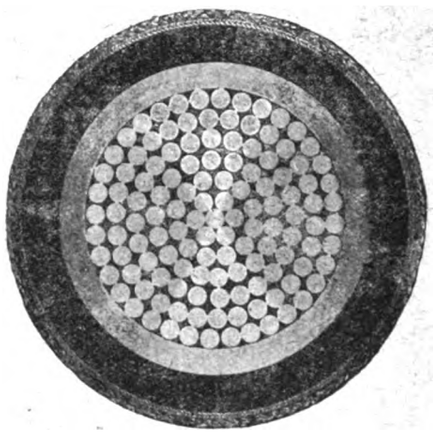

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THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JULY 28, 1917.

THE CRUCIAL PROBLEM.

Few will be disposed to deny that of all the problems that will have to be dealt with after the war, the greatest will be the problem of bringing about satisfactory relations between employer and employed. The difficulty will be as great whether the employed is a private company or a corporation. If there were any who entertained a lingering belief that the supersession of the private employer by the state or the municipality, would sweep away suspicion and friction and ensure harmony, the events of the past few weeks must have relegated their belief to the limbo of vanished hopes. The worker has clearly seen that though names may be changed, the nature of the relation between employer and employed remains the same. Economic facts are not always pleasant to contemplate, but until the worker recognises that these facts place limits upon the employers' ability to meet every demand that may be made upon them, there can be little chance for a lasting industrial peace. What, first of all, is necessary, is that each of the two parties should get a clearer view of the aims, duties, and capabilities of the other, that suspicion should be allayed, and that a more intelligent sympathy should be aroused. All classes in the community will have to make a greater effort than ever before to see things not as they appear from the standpoint of a particular class but as they are. To begin with, it must be admitted that wages were as a rule too low—so low, that it was in many cases impossible for a worker and his family to live as they might reasonably expect to do. On the other hand, the worker seldom gave his best effort, and he resisted all encouragement to do so. Hence we had a condition of suppressed enmity, which broke out into active hostility on the slightest occasion. Neither understood the attitude or the difficulties of the other. When, by means of strikes, or threats to strike, wages were altered, the immediate aim too often was merely to effect a compromise that would enable the difficulty for the time being to be readjusted. Thorough investigation of fundamental conditions was never attempted, and thus a recurrence of disputes was almost bound to follow. The task of those who would ameliorate social conditions in the future, is first of all to help both employer and employed to a better understanding of their mutual difficulties, their aims, and the means necessary to secure them. We welcome therefore such organisations as the Industrial League, of which some particulars are given in another column. On Friday of last week this association brought together an interesting company, representing widely different interests, and labour questions were discussed with more than usual frankness and sincerity. There was an evident desire on the part of the speakers, not merely to state their own point of view, but to learn the way to harmonize different points of view, and to discover some means of helping the Nation to come into a condition that will enable it go forward at the end of the war in the work of rebuilding and enlarging the industrial life of the community. That work will be of almost overwhelming difficulty, and any agency which in any measure can contribute to it, ought to receive the earnest support of all thinking men. There cannot be too much effort to awaken the sympathies of the employer, or to help the employees to understand the tremendous task that will confront the industrial and commercial leaders.

END OF THE STRIKE AT BURNLEY.

The request of Burnley Corporation to the tramway employees on strike to hand in their uniforms on June 19 was not complied with, nor did the men return to work. On July 21 the Tramway Committee passed a resolution to the effect that while wages in respect of the broken week had been forfeited by the employees who left work without notice on the 14th inst., the Committee had no desire to enforce the forfeiture, and would therefore pay to all such employees all wages for time worked, and would also repay all deposits in the hands of the Corporation on condition that the said employees returned to the depot all property of the Corporation in their hands.

At the beginning of this week the general manager issued advertisements inviting men and women to apply for employment. The police will enforce freedom to work, and any attempted intimidation on either side will be suppressed. Large numbers of applications were received. The public feeling on the strike was so acute that it was felt no successful attempt could be made at interference with the new staff. On the same day the strikers are stated to have threatened the local carriage companies, that if they run 'buses or waggonettes for the convenience of the public the members of the Tramway and Vehicle Workers' Union in their employ would be withdrawn.

Elsewhere in this issue is given the resolution of the Lancashire and Cheshire tramway authorities refusing, while the Burnley strike lasts, to meet the district committee of the Tramway and Vehicle Union to discuss the difficulties that have arisen regarding the application for an increased bonus. As a sequel there was an attempt at a meeting of the Union on July 22 to institute a sympathetic strike in support of the Burnley men, but the proposal was rejected on the advice of the executive council of the Association. The meeting decided, however, to support the Burnley branch in their action in striking, and appointed Mr. T. M'Lean (president of the District Council), Mr. T. Neafsey (secretary of the District Council), and Mr. S. Hurst (acting general secretary of the Union) to take over and conduct the negotiations on behalf of the branch.

The General Purposes Committee of the Corporation, who have taken over the strike question from the Tramways Committee, on Sunday evening agreed to receive a deputation from the Union, the secretary of the local branch having made an application to that effect to the Tramways Committee.

Following the meeting of the General Purposes Committee with the officials of the two unions on Monday evening, the Committee passed the following resolution: "That before negotiations can be entered upon with this Committee with reference to the dispute between the two unions the men must resume work." This decision was communicated to a meeting of the strikers, with the result that work was resumed, and the Tramway and Vehicle Workers' Union officials met the Tramways Committee on Thursday.

Successful Accumulator Vehicles.—The Edison Accumulator tower wagon which was purchased by Southampton Corporation Tramways in 1916 has fully met expectations. In commenting on its work Mr. W. T. Robson, the general manager, says that in addition to carrying out the carting work connected with the department they had been able to use it to a great extent in the work of the electricity education, health and relief departments. The amount spent on maintenance has been quite negligible. A tower wagon of the same type continues to give satisfaction, the only drawback being the slow speed on gradients, which it is hoped will be improved shortly. The immediate effect of the two vehicles has been a speeding up of the work done and a gratifying saving in horse food, stabling and attention.

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MANCHESTER TRAMWAY AWARD UPHELD.

EMPLOYEES' NEW DEMANDS.

An intimation was received at Manchester on July 19 from the Committee on Production that they were unable to make any departure from their award of June 11, under which tramway employees in Lancashire and Cheshire were given an increased bonus of 2*s.* 6*d.* per week. In their report on the rehearing, the Committee state that they "gave the fullest opportunity to enable the employees to give particulars of any difficulties relative to the advances given in the finding of June 11, and of any special conditions that may operate in Manchester." Having also heard the representatives of the Corporation they decided:—

That the case presented to them differed in no material particular from that put forward at the hearing of June 8, and offered no reason for a departure from the award of June 11.

ATTITUDE OF OTHER AUTHORITIES—THE BURNLEY STRIKE.

On July 19, at a meeting of the Lancashire and Cheshire tramway authorities, held at Manchester, Alderman Lindsey, of Salford, presiding, the following resolution was passed:—

"That this meeting of representatives of nineteen tramway authorities of Lancashire and Cheshire, municipally and company owned—although fully willing to meet the representatives of the Tramway and Vehicle Workers' Union, as requested in the letter from the assistant secretary of the union dated July 16, regret that, owing to the union's action in adopting and giving official sanction to the illegal and unconstitutional strike at Burnley, after the award of the Committee on Production, and during the present national crisis—cannot now agree to such a meeting taking place until normal conditions are resumed at Burnley; and also that normal conditions are maintained in the whole of the undertakings which were parties to the last arbitration."

It was resolved, at a meeting of the Lancashire and Cheshire District Council of the union, on July 22, to press for a 7*s.* 6*d.* advance for Manchester and the two counties. The Manchester employees met on the same day and accepted the report of their delegates on the proceedings before the Committee on Production. The dispute therefore remains in abeyance until the new demand is disposed of.

EMPLOYEES' DEMANDS AT WOLVERHAMPTON.

The arbitrator who inquired into the differences between Wolverhampton Corporation and their tramway employees has awarded an advance at the rate of 5*s.* per week to each worker concerned of the age of 18 and upwards, and 2*s.* 6*d.* per week under that age, to take effect as from April 1. Time and a quarter is to be paid to members of the traffic staff in respect of all hours worked on week days in excess of ten, and time and a half be paid for Sunday in respect of Sunday excursion and other special cars run outside and beyond the ordinary Sunday working hours. The case of cleaners and other night workers called to undertake extra or special duties on snowy nights was, by consent, left for the consideration of, and for concessions by the Corporation.

ARBITRATION AT EDINBURGH.

The arbitration between Edinburgh Tramways Company and their employees was conducted at Edinburgh on July 19 by Sir Richard Lodge, who later in the day issued the following award:—(a) Pointsmen, drivers, conductors, and regulators—That a war bonus of 5*s.* per week be paid to men employed as above, and also to depot staff, pit and pulley greasers. (b) That a war bonus of 2*s.* 6*d.* per week be paid to conductresses. (c) That a war bonus of 1*s.* 6*d.* per week be paid to boys under 18 years of age. (d) That time and a half rates be paid for Sunday duty between 6 a.m. and 12 midnight to the departments not already in receipt of the same, with the exception of the splicers and to the employees who are not paid on time rates but receiving a weekly wage. (e) That the above payments be reckoned from the first pay day following the issue of this award. (f) That while the company pay the war bonus as granted above, the free passes shall be withdrawn, but all employees shall be carried free when going on or off duty or on any journey connected with the fulfilment of their duties to the company.

Arbitration has been agreed upon by Leith Corporation and their tramway employees upon the application of the latter for improved conditions, including an increased war bonus of 1*s.* 6*d.* per week for motormen and conductors, 5*s.* per week and time and a half on Sundays for washers, and 5*s.* per week for shed labourers. Except in the case of shed labourers the increases are to apply to men and women alike.

REVISION OF FARES AND STAGES.

Since July 23 workmen's fares have been issued at Nottingham on all cars leaving a terminus before 7.30 a.m., instead of 7 o'clock as at present (formerly it was 8 o'clock); but this concession is counterbalanced by the decision that no return tickets will be issued.

Exeter Tramways Committee recommended the Corporation to suspend the issue of penny return fares in the dinner hour. In moving the adoption of the proposal Councillor Varwell, chairman of the committee, stated that the undertaking could not afford to allow the reduced fare. There was only £600 to the good on the year's work. Renewals had cost over £2 000 The cost of materials and equipment had gone up, and after the war the cost would be considerable. There was not sufficient reserve fund to meet it. Half fares caused a great fall in receipts, and were taken advantage of by people who could afford to pay the full fare. The reduction was made in 1914, but if the Committee could have foreseen what was to happen they would not have granted it. In many other towns the half fares had been abolished The early morning halfpenny fares would remain in force, but the new manager's experience was that halfpenny fares did not pay. The Council adopted, by 21 votes to 6, an amendment that the recommendation be deferred for six months.

Leicester Tramways Committee are considering a scheme for halfpenny fares outside a mile radius for each quarter mile during the slack hours. This would enable transfers to be dispensed with. The main objection to the scheme is that the conductors would not be able to collect all the fares within the short distance of a quarter mile.

MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

As briefly mentioned in our last issue, it has been arranged that the annual business meeting and conference of the Municipal Tramways Association shall be held at Blackpool on Thursday and Friday, September 20 and 21. The last two meetings have been held in London and in view of the fact that a large number of the members come from the north, and owing to the increased railway fares and limited hotel accommodation at the present time, it was felt that a meeting in the north would meet the wishes of the members.

Thursday, the first day, will be devoted to the discussions and the second day to the annual general meeting. Reports and discussions will take place upon the following subjects:—

The measures to adopt to ensure the highest earning capacity.
Rule of the foot-path.
Differentiation in Tramway Fares.
Development of Tramways.

The head-quarters of the Association will be at the Savoy Hydro, North Shore, Blackpool, where the meetings will be held. Following the arrangements which have met with the approval of the members for the past three years, there will be no public functions or entertainments.

FREEDOM FROM ACCIDENT COMPETITION.

At the July meeting of the London Safety First Council, held at the Middlesex Guildhall, Westminster, the Council adopted a recommendation by the Drivers' Educational Committee for the promotion of a Freedom from Accidents Competition upon the following conditions:—

(1) The competition is to be known as the "London 'Safety First' Freedom from Accidents Competition."
(2) The object of the competition is to encourage, by the award of money prizes and badges of merit, drivers of all classes of vehicles to exercise every care and discretion in the performance of their duties.
(3) The competition will be divided into three classes, viz.:—(1) Drivers of motor vehicles; (2) drivers of horsed vehicles; (3) drivers of tramcars.
(4) Thirty prizes of 10s. each, together with a first-class badge of merit, and fifty second-class badges of merit, are offered in each of three classes, to drivers whose records, in the opinion of the council, qualify them to receive such awards.
(5) All drivers continuously employed for the period of twelve months from October 1, 1917, by one or more of the corporations or firms operating in the Greater London area will be eligible to compete in their respective classes, and intending competitors should at once notify their employers of their desire to take part in the competition.
(6) The competition will commence on October 1, 1917, and terminate on September 30, 1918.
(7) Employers must, not later than Tuesday, October 22, 1918, send to the honorary secretaries of the London "Safety First" Council, a duly certified return giving the names and addresses of those of their employees who, during the twelve months ending September 30, 1918, had been free from accidents.
(8) The decision of the London "Safety First" Council on all matters affecting this competition is to be final and binding.

On the recommendation of the Publicity Committee it was agreed to make application to the education authorities in the Greater London area for permission to promote a competition among scholars attending elementary schools, and to award prizes for essays on "Safety First" written by school children. The committee also reported having issued a poster dealing with "safety" advice for pedestrians.

Cost of Bradford Accident.—All claims arising out of the tramway accident at Wyke in January last have now been settled. It was stated at a meeting of the Tramways Committee on Monday that the total cost, including doctor's fees and legal charges and repairs (amounting to £190 on the two cars damaged by the collision) amounted to £2,377. The accident was caused through a car being started at a moment when the driver had left it to put a parcel on a car going in the opposite direction. The only occupant of the run-away car was the conductress, who, after attempting to stop the car, jumped off. After running a mile down an incline the run-away car ran into another car in which were twenty passengers. The cars telescoped, and when interlocked continued to travel for 100 yards. Most of the passengers suffered only slight injuries, but the conductress of the car which was run into was so seriously injured that she subsequently died.

Passengers per Car Mile in Lancashire.—In connection with the recent re-opening of the arbitration between Manchester Tramways Committee and their employees, it is stated that the grounds on which the Manchester workers' separate application was made were that the cost of living was higher and the work harder in Manchester than in the smaller towns. On behalf of the Corporation, it was contended that foodstuffs were cheaper in Manchester than in the other towns affected by the award, and also that fewer passengers per car mile were carried than in the majority of the Lancashire towns.

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MISCELLANEOUS NEWS AND NOTES.

Trolley Boom Safety Devices—Mr. R. Birkett, general manager of the Southend Corporation Tramways, is about to fix on each of the cars a safety device for arresting the fall of trolley booms.

Hours of Work at Bournemouth.—The Tramways Committee has adopted the recommendation of the general manager that the hours of the depot staff be reduced from 56 to 54 hours per week.

No Petrol for Holiday Excursions.—The Minister of Munitions announces that it will not be practicable to grant allowances of motor spirit for vehicles used for holiday excursions. In view of the requirements for war purposes it is necessary to effect every possible economy in consumption.

War Time Decline in Tramway Advertising.—The manager of an important corporation tramway remarks in a recent report that, owing to an entire disinclination of traders to advertise, it is doubtful whether anything can be expected from this source of revenue during the forthcoming year.

Cardiff Electricity and Tramways Committee have adopted a plan for the erection of a garage at the Wood Street depot for the storage of electrical vehicles belonging to the department, and the re-charging of these and other electrically-propelled vehicles. The estimated cost was £538.

"Stay-In" Strike Sequel.—A woman conductor was fined 5s. at Manchester police court for causing an obstruction with a tramcar during the "stay-in" strike. She requested a passenger to go to the front end of the car, and because he refused she declined to ring the bell for the car to start.

Rule of the Footpath.—Huddersfield Watch Committee has decided in favour of the suggestions of the Tramways Committee as to the rule of the footpath. The question of motors and other vehicles passing stationary and other cars has been referred to the chief constable.

Huddersfield Extension.—At a meeting of the Tramways Committee on July 17 the manager reported on the advisability of doubling the track of the Bradley section, and he was instructed to apply to the Ministry of Munitions for authority to purchase the necessary material.

Messrs. C. P. Sandberg inform us that they have taken new offices at Princes' Mansions, 70, Victoria Street, Westminster, London, S.W.1, which will be their address as from August 1. Their telegraphic address and telephone number will remain as before, namely, "Sandberg, Parl., London," and Victoria 4788. The change of address has been necessary owing to the requisition of Palace Chambers by the Government for the accommodation of the staff of the Ministry of Food.

Faithful Employees Recognised.—Brighton Corporation Tramways Committee have resolved that the thanks of the Committee be given to all the employees of the tramways department who remained at work during the recent strike, and that, in the case of those employees who are paid by the hour they be paid double wages for the time worked during the four days of the strike, and that in the case of those employees paid by the week their wages for the week ending July 1 be increased by two-thirds.

New By-Law Regarding Payment of Fares.—"The London Gazette" of July 24 contained an announcement by the London United Tramways Ltd., that the following new by-law will come into force on October 1: "Each passenger shall immediately upon demand, and in case no demand shall have been made, before leaving the car, pay to the conductor the fare legally demandable for his journey and accept a ticket therefor. Any passenger leaving a car shall be deemed to have completed his journey."

Methods of Tramway Thieves.—During the hearing of a charge against George Brumett at Westminster Police Court the methods of a gang of tramway thieves were explained. The gang, consisting of eight well-dressed men, frequented a crowded terminus and, going in a semi-circle, pushed and struggled with the passengers, while Brumett, one of their number, effected the actual robberies. Brumett, who had his ribs broken in the course of a struggle with the officer who arrested him, was sentenced to three months' hard labour.

Tramway Wages Arbitration.—An arbitration arising out of an application for 10s. a week all-round advance in wages put forward by the employees of the Bexley Heath, Erith and Dartford tramways took place before the Committee on Production at 5, Old Palace Yard, Westminster, on Wednesday. The continuously increasing cost of living was the main argument advanced in favour of the claim. Sir David Harrel, who conducted the arbitration, intimated that the Committee's award would be given in a few days.

Oil-Break Switch-Gear.—The British Thomson-Houston Company have issued a well-illustrated descriptive list of their ironclad draw-out oil-break switch-gear. These three-phase switches are made in two forms, and have been developed for mining and industrial service where compact, totally enclosed, dust-proof and drip-proof switch-gear is required. The gear is provided with interlocking devices which prevent accidental contact with live metal and ensure that the switch is isolated from the line before it can be opened up for inspection. The switch, instruments and automatic features are mounted on a sliding carriage, and connected to the bus-bars or cables through plug contacts. The simplicity of the design ensures that all parts are readily accessible. In addition to the photographic views, the pamphlet contains diagrams showing the connections.

Boarding Cars in Motion.—In Glasgow Sheriff Court judgment has been given for the defenders in an action by Mrs. Helen Hosie, claiming £100 damages against Glasgow Corporation in respect of injuries sustained by her when boarding one of the defenders' tramcars on March 28 last. Sheriff Lyell found that the pursuer, while endeavouring to board a car then in motion, was injured by being dragged partly on the street and partly on the car, and that the accident was materially contributed to by her negligence in so endeavouring to board the car while in motion. The Sheriff said it seemed now to be pretty conclusively established that an intending passenger who chose to endeavour to jump on to a car in motion did so at his own risk. In this case pursuer, although only 38 years old, is a stout, heavy woman, and any endeavour by her to accomplish the feat of springing on to a vehicle in motion must obviously be accompanied by danger to herself.

Women Employees at Keighley.—Mr. H. Webber, borough electrical engineer and tramways manager of Keighley, in a report says that the employment of women as conductresses has been extended during the year, and they have replaced all men conductors. The change, which was forced on the undertaking by the war, has proved very successful. He believes this to be also the opinion of the majority of the passengers. An experiment with women as drivers was tried in the early part of last winter, and Mr. Webber thinks it would have been successful if tried in the summer months. As the military authorities are now pressing all tramway undertakings to instal women drivers, it is probable that the experiment will be repeated, but Mr. Webber remarks that it would be most undesirable to have no men drivers whatever. It would be necessary to keep men on the trackless vehicles and one or two on the central tramways to give the necessary stability to the traffic department.

Electricity Supply to Llandudno Tramway.—At a meeting of Llandudno Council on July 20, the Electricity Committee reported that, after considering the subject of power for traction purposes, they recommended the Council seriously to consider the question of giving the Llandudno and Colwyn Electric Railway Company formal notice to terminate the existing agreement, with a view to entering into a fresh arrangement on terms that will be more equitable, having regard to the increased cost of production. The Council have supplied the power for the operation of the electric railway between Llandudno and Colwyn Bay since that line was opened, under the agreement which the Committee proposed should be terminated. The price paid ranges from a penny a unit according to consumption. By a majority the proposal was referred back to the Committee for further consideration, as it was associated with general questions as to the financial position of the electric supply undertaking.

A Reversed Decision.—The Second Division of the Court of Session, Edinburgh, have on appeal reversed a judgment of Lord Anderson in the Outer House in an action by Stewart Taylor, Old Kilpatrick, against the Dumbarton Burgh and County Tramways Company. The pursuer sought £500 damages in respect of injuries received by his two-year-old son. In January, 1916, a number of children collected near a repairing tramcar watching the men repairing an electric standard in Old Kilpatrick. When the work was completed the car was restarted. Most of the children were on the north side of the car, and they were warned off, but the pursuer's son was on the south side and a wheel of the car passed over his right hand, causing the loss of two and a half fingers. Lord Anderson granted the pursuer decree for £150 damages, on the ground that the car conductor was in fault. The Second Division recalled this judgment, and assoilzied the defenders with expenses. Their Lordships were of opinion that the tramwaymen were not responsible for the accident, because they did not know nor had reason to believe that the pursuer's child was on the south side of the car, and there was no duty therefore upon them to look out on that side of the car.

The Industrial League.—What may be described as the inaugural dinner of this new association took place on Friday evening of last week at the Monico. It proved an occasion of exceptional interest, and it was in every respect a successful beginning of what we hope may come to be a strong and influential factor in the effort toward industrial harmony. Mr. Lee Murray presided, and among those who took part in the proceedings were Sir Albert Stanley, Mr. George S. Roberts, Sir Archibald Denny, Mr. G. Wardle, Mr. H. S. Scholey, Mr. F. Huth Jackson and Mr. H. E. Blain. Several of the speakers expressed their views with unusual frankness and sincerity. The League has gradually taken form during the past two years as the result of a series of meetings between labour leaders and employers that have taken place generally at the Eccentric Club. The gatherings have afforded a free interchange of opinion and unanimity has been arrived at on the necessity of friendly co-operation between employers and employees in order to secure the expansion of industry. It is recognised that if this is to be secured adequate remuneration and security must be given the worker, who on his part must make a better return than in the past. The League proposes to form district associations and "to get right down to" the workers themselves; to bring them into contact with manufacturers and it hopes particularly to interest the small manufacturer. The work will be carried on as vigorously as the funds at the disposa of the League allow, and at the gathering last week promises of additional support of over £1,000 were made to Mr. Scholey, the hon. secretary, whose address is 56, Victoria Street, and who will be glad to give all inquirers further explanations of the genesis and objects of the League.

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PERSONAL.

Mr. F. A. Fitzpayne, general manager of Leith Corporation Tramways, has received an increase of £100 in his salary, to be paid in two annual increments of £50.

Capt. P. H. di Marco, R.E., pre-war manager of the Barnsley and District Electric Tramway Company, Ltd., after nearly three years at the front during which he was twice wounded, is now in a military hospital in England.

Mr. T. B. Murray, a managing director of the Albion Motor Car Company, Ltd., of Scotstoun, Glasgow, has received the degree of D.Sc. from Edinburgh University for his thesis, "Some Research and Inventions in Hydraulic, Electrical, and Motor Vehicle Engineering."

Distinctions for Tramway Soldiers.—Major F. J. Chapple, power and rolling stock superintendent, of the Potteries Electric Traction Company, who is serving in France with an artillery unit, has been awarded the D.S.O. Regimental Sergeant-Major H. Parker, Royal Dublin Fusiliers, and Corporal J. Cartlidge, former employees of the Company, have been granted the Military Cross and the Military Medal, respectively.

Mr. William Marsh, engineer and manager of Brighton Corporation Tramways, has been recommended by his committee for an increase of salary from £400 to £500 per annum. The peculiar condition is attached to the increase that the amount of it shall, during the time that Mr. Marsh is acting as an assistant director of shipyard labour, be reduced by an amount equivalent to the pecuniary benefit derived by him from the allowance for expenses to be made to him by the Government.

The General Electric Company, said Mr. Hirst, the chairman, at the annual meeting, have so far discovered awarded to their men, two Military Crosses, two Distinguished Conduct Medals, eight Military Medals, and two Meritorious Service Medals. Owing to the modesty of the British Tommy they seldom heard of these distinctions until the men were home on leave. One of the directors, Mr. Leonard Byng, was absent, owing to his having just joined his brother in France. The directors' promise to keep open the positions of the brave fellows holds good.

Mr. Edmund Taylor, of Blackpool, has died at the age of 79. He was a large contractor, and among the works which he carried out was the construction of the tramways in Shipley and Farnworth.

CONTRACTS AND ORDERS.

Derbyshire County Council propose to purchase six trailer wagons, the estimated cost being £650.

British Westinghouse Electric and Manufacturing Company are to supply a 5,000 kw. generating set to Shoreditch Borough Council at £26,538.

The Newport Electricity Committee has accepted the following tenders for plant extensions:—British Westinghouse Electric and Manufacturing Co., Ltd., electrical equipment for induced draught plant; Musgrave and Company, Ltd., induced draught plant; Davenport Engineering Company, cooling towers; E. Green & Son, Ltd., additions to fuel economiser.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended July 21 give total receipts of £206 964, or £28,172 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £96 11s. 6d. per mile of single track, and last year at the rate of £83 8s. 7d., thus showing an increase for the week of £13 2s. 11d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

JUST PUBLISHED.

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INCOME TAX

IN RELATION TO

LOCAL AUTHORITIES,

BY

F. OGDEN WHITELEY, F.S.A.A.,
City Treasurer of Bradford, and

WILLIAM WHITTINGHAM,
City Treasurer's Office, Bradford.

WILLIAM BYLES & SONS, Ltd., Publishers, BRADFORD

FINANCIAL REPORTS AND MEETINGS.

Mather & Platt, Ltd.—An interim dividend on the ordinary shares of 5 per cent. for the half-year, less income tax, has been declared.

Sao Paulo Tramway, Light and Power Company.—A dividend of 10 per cent. has been declared.

Liverpool Overhead Railway.—The Company announce a dividend for the past half-year at the rate of 2½ per cent. per annum on the ordinary shares. Similar distributions were made for the corresponding periods of each of the four preceding years.

City of Buenos Aires Tramways.—The directors of the City of Buenos Aires Tramways Company (1904) have declared a dividend of 1s. 3d. per share (being at the rate of 5 per cent. per annum), less tax, for the three months ended June 30.

Egyptian Delta Light Railways.—The receipts for the year ended March 31 were £232,927, compared with £192,927 in the preceding year, and the working expenses were £180,821, compared with £142,109. After providing for interest on debentures and fixed charges £106,807 remains. From this must be deducted the sum of £57,558 in suspense account. In consequence of the abnormal and increasing price of coal, stores and materials, and the uncertainty for the future the directors are unable to recommend a dividend.

Southampton Corporation Tramways.—The results for the year ended March 31, 1917, as shown by the report of the general manager and engineer, Mr. W. T. Robson, were very satisfactory considering the special difficulties that prevailed. The abnormal prices of materials and heavy special war expenditure have, as elsewhere, constituted a great handicap. The receipts, which amounted to £88,183, an increase of £9,355, again formed a record. The gross balance of £16,669 has been appropriated as follows:—Sinking fund charges, £7,399; proportion of cost of new car, £796; third party insurance fund, £256; depreciation and renewals fund, £5,218; and contribution to rates, £3,000. A summary of the accounts for the past five years is appended:—

Year ended March 31.	1917.	1916.	1915.	1914.	1913.
Total revenue	£88,183	£79,828	£71,038	£70,598	£66,534
Working expenses	£56,745	£48,617	£48,617	£46,521	£47,040
Profit on working	£27,177	£26,854	£20,732	£24,077	£19,485
Interest	£10,508	£9,123	£8,336	£7,708	£7,675
Sinking fund charges ...	£7,399	£7,614	£7,557	£7,433	£7,241
Depreciation fund	£5,218	£4,460	£5,000	£7,118	£5,000
Special expenditure ...	£1,052	£1,939	—	—	£1,422
Contribution to rates ...	£3,000	£5,000	£5,134	£2,360	—
Passengers carried	17,718,810	15,494,366	13,265,715	13,162,224	12,475,793
Fare per passenger ...	1·17d.	1·21d.	1·23d.	1·23d.	1·23d.
Car mileage	1,813,547	1,636,103	1,702,032	1,543,941	1,533,638
Receipts per car mile ...	11·67d.	11·71d.	10·01d.	10·97d.	10·41d.
Expenses per car mile ...	8·07d.	7·77d.	7·09d.	7·23d.	7·36d.
Ratio of expenses ...	64	60	68	66	71

Portsmouth Corporation Tramways.—The annual report of the general manager, Mr. W. R. Spaven, for the year ended March 31, 1917, shows that the total revenue for the year was £136,871, an average of 14.204*d.* per car mile, as compared with £127,546, or 14.101*d.* per car mile, in the previous year. After deducting working expenses, grants to dependents of employees serving with the forces, war bonuses, and adding interest on credit balances, there is a balance of £64,583, as compared with £66,218 for the preceding year. After payment of interest, income tax, etc., there is a net balance of £18,680. The sum of £14,000 is transferred to the aid of the rates, £6,380 to the renewals fund, £1,381 to reserve and insurance fund, £188 to capital outlay, and £4,000 is reserved for the Cosham improvement. The traffic revenue is regarded as highly satisfactory, in view of the fact that the general holidays were not observed at Whitsun and August, and that during the winter months the services were much curtailed. A summary of the accounts for the past year and the four preceding years is appended:—

Year ended March 31.	1917	1916	1915	1914	1913
	£	£	£	£	£
Total revenue	136,871	127,546	123,991	116,990	109,832
Working expenses	73,166	62,079	58,658	57,620	52,227
Profit on working	£63,705	£65,467	£65,333	£59 370	£57,605
Int. on credit balances ...	878	751	780	829	765
	£64,583	£66,218	£66,113	£60,199	£58 370
	£	£	£	£	£
Interest	21,667	21,672	21,643	21,593	20,875
Sinking fund	18,061	18,055	18 455	18 263	17,462
Income tax on profits ...	6,175	3,503	1 940	1,301	964
Allowance–renewals, 1902-9	—	1,211	—	—	—
	£45,903	£44,441	£42,038	£41,157	£39,301
	£	£	£	£	£
Net profit	18,680	21,777	24,075	19,042	19,069
Balance brought forward...	7,278	9,569	10,702	11,374	8,067
Contribution to rates ...	14,000	13,000	10,000	5,000	4,000
Reserve and renewals ...	11,769	9,060	10,186	11,123	11,762
Contribution to capital ...	188	2,006	5,023	3,591	—
Balance carried forward ...	Nil	7,278	9,568	10,702	11,374
Passengers carried... ..	31,798,562	29,338,918	27,554,194	26,266,342	24,520,647
Fare per passenger ...	1.018d.	1.033d.	1.061d.	1.052d.	1.052d.
Car mileage...	2,312,391	2,170,778	2,438,621	2,506,058	2,155,508
Units per car mile... ...	1.417	1.238	1.139	1.103	1.206
Power cost per car mile ...	.911d.	.760d.	.549d.	.576d.	.582d.
Receipts per car mile ...	14.204d.	14.101d.	12.201d.	11.204d.	12.229d.
Expenses per car mile ...	7.017d.	6.556d.	5.599d.	5.518d.	5.815d.
Ratio of expenses	49.39	46.49	45.88	49.25	47.55
Total track mileage ...	34⅝	34⅝	34⅝	34⅝	30⅝
Number of cars in stock ...	100	100	100	100	100

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PERNAMBUCO TRAMWAYS and POWER COMPANY.

FAVOURABLE PROGRESS.

The fifth ordinary general meeting of the Pernambuco Tramways and Power Company, Ltd., was held on Wednesday, July 24, in the offices of the company, River Plate House, London, E.C.—Mr. Follett Holt, M.Inst.C.E., chairman of the company, presiding.

The SECRETARY (Mr H. Tattam) having read the notice convening the meeting and also the report of the auditors,

The CHAIRMAN said: The report before you to-day deals with the twelve months which ended with last December. We are very late, therefore, in laying it before you, but the delay in present circumstances has been quite unavoidable. Our business in Pernambuco grows apace, and it is not easy to cope with the clerical work entailed, and furthermore the mails to and from Pernambuco are few and far between and very belated, but I hope next year we shall be able to present our report at a much earlier date.

THE DEVELOPMENT STAGE.

In examining the accounts for the past year I trust that you bore in mind that our undertaking was then, as it is still, in the development stage. Notwithstanding the fact that the gas works were under reconstruction and the Brazil Street Railway line was under conversion to electric traction and that very high prices ruled for coal and all materials, we obtained a ten per cent. increase in net earnings, the total earnings being sufficient to cover with a small margin the debenture charges and the amount that would have been set on one side for amortisation if it had not been agreed to allocate that sum to the development of the undertaking. As exchange throughout the year was very much against us I think on the whole this result was not altogether unsatisfactory. We have now a better exchange, and as our gross and net earnings continue to show steady improvement, unless anything unforeseen happens, I hope that this year, after providing for fixed charges, we shall be able to establish the renewal fund required to take care of the wear and tear and obsolescence not covered by the day to day maintenance expenditure and possibly go a step further, but we must of course proceed with caution in these difficult times and in these early days of this important enterprise.

THE BRAZILIAN STREET RAILWAY.

We are glad to be able to report the disappearance from Pernambuco of the Brazilian Street Railway, which was a very antiquated and unprofitable concern, and we are only waiting to receive the final certificate of conversion to place that company in liquidation. Three of the four directors of the street railway are also directors of our company, and the burden of their fees, although a slight one, will then be removed, and as further expenses will be trifling I think we may consider that the ramshackle railway with all the expense and trouble it might have caused to itself and others has been peacefully and economically interred. We are still working with steam traction the part of the Olinda Street Railway which was not in such violent need of repairs, but the local company owning that undertaking has also disappeared during the past year, having been completely absorbed into our system. The other notable features of the year were the completion of the new plant at the gas works, and the extensive repairs carried out with the old telephone system, and we have now a right to expect that the gas works and the telephones will each provide in the future their fair quotas to the revenue account and so aid the electric tramways to bring prosperity to the company.

LIGHT AND POWER SUPPLY.

As regards the electric light and power supply, we have as you know only just touched the fringe of the task and the possibilities before us. It is a very difficult matter to purchase and to finance new electrical plant and materials at the present time, but under urgent pressure from our friends at Pernambuco we felt called upon to make a step forward in this new field, and we trust that during 1918 we shall see some good results from the development of this branch of our business.

Thanks to our able colleague Mr. Gudin, who remained throughout the year at Pernambuco, we were able to reach an agreement with the Government upon a number of outstanding and important questions. The agreement was of a give and take nature, which, whilst fully protecting the public interests, provided for an extension of our concession, and this enabled us last December, as you will remember, to rearrange our affairs on this side and place the company in a better position to carry out the work before it. Our general manager, Mr. Butler, has also done yeoman's service during a period crowded with anxieties and difficulties, and it is a pleasure to acknowledge the ability and energy shown by both these gentlemen in protecting and developing not alone the company's interests but the public interests of the city of Pernambuco.

TRAMWAY EXTENSION POSTPONED.

On account of the necessity for the curtailment of the immediate programme of tramway construction, the contract for the tramway construction with Messrs. J. G. White & Co., Ltd., has been terminated by mutual consent. I take this opportunity of acknowledging the admirable way in which the work entrusted to this firm has been carried out, and I am glad to say that we can still count upon their skilled technical assistance in the work before us.

In future years I hope we shall be able to make our yearly reports on the technical side more informative and complete as reports of a company of this nature in my opinion should be, in order that shareholders may be in a position to judge for themselves of the technical development or otherwise of their undertaking and of the efficiency or otherwise of those they choose to represent them. Meanwhile I may say that we have a great deal of information in the office, and this is at the disposal of any shareholder who may be sufficiently interested to call upon the secretary for the purpose of reviewing it.

IMPROVING RESULTS EXPECTED.

You will remember that our company was incorporated shortly before the war and that the greater part of the construction and the reconstruction, or, as our general manager describes it, "the work of making the scrap heap return to life and usefulness" has taken place during the war and therefore the task has been bristling with difficulties. I think I may say that we have already passed our acute troubles and providing that no financial crisis in Brazil intervenes to affect materially the present rate of exchange we hope to be able to show for some years steadily improving results. The traffic on our tramways is of course influenced to a great extent by the commercial situation of Pernambuco. For the first nine months of the past year trade was very indifferent, but a good sugar cane crop last October and high prices for both sugar and cotton gave a great impetus to local business and we have since benefited from the increased activity of all classes of the population. The war has given an extraordinary stimulus to some of the exports of Brazil such as manganese ore, meat and beans; no doubt much of this new business will remain and even expand after the war and so help the main exports of coffee and rubber to support exchange. The demand for meat since the outbreak of war has greatly aided the development of cattle raising in Brazil. The tireless activity and enterprise of packing houses and freezers have already secured the means of export, and with the markets of the world open it only now rests with the Brazilian landowner and capitalist to fence and stock the tens of thousands of square miles of grass lands available in order to make them a great, if not the greatest, source of their nation's wealth and usefulness. Little labour is required, the grass land is there, the capital for fencing and for stock will be found as readily as it was in earlier days in the Argentine, and the bulls and the cows will do the rest. A new vista of congenial employment and profit is opened out for the fortunate Brazilian landowner and the development of the pastoral industry must have, I think, a very marked effect upon the future prosperity of the country and on the maintenance of exchange with which we and all foreign enterprises are deeply concerned. We must, however, expect ups and downs in exchange rates until more normal times return, and meanwhile I must beg of you always to bear in mind the effect a decline in the sterling value of the milreis must have upon the sterling profits of our undertaking. Before closing my remarks I think you will be interested to know that, according to our cable advices, our results in sterling for the first five months of the year show an increase of 27 per cent. in gross and 30 per cent. in net as compared with the same period of last year. In conclusion, the Chairman moved the adoption of the directors' report and statement of accounts for the year ended December 31, 1916.

Mr. SIDNEY JONES seconded the motion, and it was carried unanimously.

The CHAIRMAN moved the re-election of Mr. Eugenio Dodsworth as a director, and said that that gentleman was in Rio at the present time. His services were always at the disposal of the company.

Mr. WM. HIGGINS seconded the motion, and it was agreed to.

On the motion of the CHAIRMAN, seconded by Mr. H. K. HEYLAND, Mr. Henri Maréchal was re-elected a director, the CHAIRMAN remarking that Mr. Maréchal was unable to be present that day as he was resident in Paris where he was employed on important war work for his Government.

The auditors, Messrs Deloitte, Plender, Griffiths and Co., were re-appointed, at a remuneration of 60 guineas.

On the motion of Mr. T. PROCTOR, a vote of thanks was awarded to the directors and the staff at home and abroad for the way in which they had carried on the business.

DICK, KERR & Co.,

Limited,

ABCHURCH YARD, CANNON STREET, LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. Prev.	DIVIDENDS. Last.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH, JULY 26, orprevious	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt....	—	67	78¾	78
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	56/3	56/3
4%	4%	Do. 4% Deb. ...	100	91	68½	68
4½%	4½%	Do. 4½% Deb. ...	100	98½	73½	74½
5%	5%	Do. 5% Deb. ...	100	96	68½	68
1/-	7d.	Auckland Elec. Trams. Ord....	1	1 5/32	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	89¾	91¾
7%	7%	Barcelona Trac. 7% 50 yr. Pr. Lien	100	—	103½	103½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref....	10	11⅜	10	10
4½%	4½%	Do. 4½% Deb.	100	96	77⅜	77⅜
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord.	$100	66	48¾	51½
$1½	$1½	Do. 6% Cum. Pref. ...	$100	97	90½	90½
4/-	4/-	Brisbane Elec. Trams. Ord....	5	7½	6⅞	6⅞
2/6	2/6	Do. 5% Cum. Pref.	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	28	30
6%	5%	Do. Pref. Ord.	100	106	30	31½
5%	5%	Do. 5% Cum. Pref. ...	100	103	51	54½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb ...	100	96½	55	57
£3*	£3*	Brit. Elec. Trac. Ord. ...	100	—	28⅝	29
6%	6%	Do. 6% Cum. Part. Pref....	100	—	73½	72½
5%	5%	Do. 5% Deb.	100	92	77	75½
4½%	4½%	Do. 4½% 2nd Deb.... ...	100	77⅛	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	74	80
3/-	6/6*	Calcutta Tramways Ord. ...	5	7½	6 3/16	6⅝
1/3	1/3	City of B.A. Trams.	5	5½	81/10½	81/10½
5/-	4/-	Dublin United Trams. Ord. ...	10	8	7⅜	7⅜
6/-	6/-	Do. 6% Pref.	10	12	10½xd	10½xd
5%	5%	Hong Kong Trams. 5% Mt. Debs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	19/9	19/9
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord. ...	1	¾	2/1½	2/1½
6/6	6/6	Lanarkshire Trams. Co. ...	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trams 5% Mt. Debs	100	95	79½	79½
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	Lond. & Sub. Traction Ord....	1	15/32	1/7½	1/6
6d.	6d.	Do. 5% Pref.	1	15/32	6/1½	6/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	61¾	61
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	78¾	78¾
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	34½	34½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 7/16	85/-	85/-
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	70	70
$1½	$1½	Manila Elec. R. R. & Light...	$100	102	62¾	64½
4½%	4½%	Met. Elec. Trams. 4½% Deb.	100	85½	70	70
$1½	$1½	Mexico Trams. Common ...	$100	70	25	24¾
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	38	37
6%	6%	Do. 6% Mt. Bds.... ...	100	76	29½	29½
4½%	4½%	Montreal St. 4½% Stg. Dbs (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ...	100	99	92	92
1/2*	2/-	National Steam Car	1	15/32	19/10½	19/6
9¾d.*	9¾d.*	New General Traction ...	1	¼	7/3	7/3
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	13/3½	13/3½
5/-*	6/-*	Para Elec. Rlys. Ord.	5	4½	80	75/-
—	—	Pernambuco Try. & Pr. Co. Ord.	—	1	5/10½	5/10½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80¾	80¾
6d.	6d.	Potteries Elec. Trac. 5% Pref.	1	21/32	10/9	10/7½
1/4	8d.	Provincial Trams. Ord. ...	1	5/16	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. ... 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	86	86
5%	5%	1st Mt. 5% 50 yr.	100	89½	77½	77½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	89½
5%	5%	Do. 5% Perp. Deb. ...	100	99½	74	74½
3d.	3d.	Singapore Elec. Trams. ...	5/-	¼	5/-	5/-
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93¼	93¼
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	67	69
—	—	Yorks. (W.R.) Elec. Trams. Ord.	5	⅜	18/6	17/-
3/-	3/-	Do. 6% Cum. Pref. ...	5	⅜	86/3	85/-
—	—	Metropolitan Dist. Ord. ...	100	21⅜	15½	15½
—	—	Undgd. Elec. Rys. of London...	10	21⅜	32/6	34/-
		Do. "A"	1/-	⅜	5/3	5/4½
4½%	4½%	Do. 4½% Bds. of 1933 Rd....	—	99	99½	99¼
6%	6%	Do. 6% 1st Cum. In. Db....	100	114	101	101
6%	4%	Do. 6% In. Bonds Rd. ...	—	88½	81	83½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915-16	Latest Return. 1916-17	Aggregate. Wks.	Aggregate. 1916-17	Increase or Dec.
Anglo-Argentine ...	July 22	£49,729	£48,949	29	£1,488,797	+ £6,752
Auckland ... (20 days)	June 30	21,705	23,593	52	282,694	+ 7,931
Ballarat and Bendigo ...	May 20	3,854	2,991	8	7,602	+ 21
Brazilian Traction Mlrs.	May	7,304,000	7,864,000	21	37,004,000	+ 3,003,000
Brisbane	June	31,390	32,475	26	193,595	— 755
British Columbia $	May	414,215	438,919	47	4,952,727	+ 290,427
Buenos Aires Lacroze....	June	36,213	38,020	52	464,077	— 25,457
Burmah Tram. & Light Rs	June	24,027	25,463	48	282,879	+ 29,134
Calcutta ... Rs.	July 21	69,354	71,217	29	1,957,926	+ 16,493
Cape Town	May	...	15,867	21	84,829	...
Carthagena & Herrerias	June	3,512	5,325	26	24,172	+ 7,803
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	...	...	...
East India	June	2,285	1,186	48	20,326	— 2,824
Hong Kong $ 10 Mar. to	May 12	138,638	123,523	19	250,253	— 4,574
Kalgoorlie	Mar.	2,479	2,772	13	7,396	+ 433
La Plata	June	3,735	3,852	26	25,144	— 781
Lima	Apr.	33,542	37,807	17	67,785	+ 3,684
Lisbon ... ... Escu.	May	...	233,765	...	...	...
Madras ... (2 weeks) Rs.	June 30	29,250	32,492	26	408,416	+ 38,074
Manila ... ... $	May	53,900	61,500	...	...	...
Manaos ... ... Rs.	Apr.	...	160,545	...	...	...
Melbourne	Mar.	63,000	64,506	13	186,321	— 9,179
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	July 22	2,998	4,003	28	107,045	+ 19,871
Peruvian ... $	June	929,500	965,420	52	11,128,092	+ 1,364,595
Port Elizabeth ...	May	...	3,494	21	19,877	...
Rangoon	June	4,205	4,383	26	29,620	+ 1,039
Shanghai ... $	Apr. 25	25,305	12,610	...	...	...
Singapore ... $	June 9	13,189	13,527	23	301,525	+ 17,199
Toronto ... ... $	May	903,924	992,460	21	4,889,055	+ 438,347
Winnipeg ...	May	276,980	259,794	21	1,419,144	— 27,644

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1916	Latest Return. 1917	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917.	Aggregate. Incr. or Dec.
Aberdare U.D.C. ...	July 17	389	450	+ 61	15	£6,560	+ £648
Aberdeen Corporation	,, 18	1,864	2,535	+ 671	7	15,647	+ 2,720
Accrington Corp. ...	*	...	...	...	...	...	...
Ayr Corporation ...	,, 21	745	1,382	+ 636	10	5,571	+ 1,214
Belfast City	,, 20	5,482	5,784	+ 302	16	97,963	+ 8,602
Birkenhead Corp. ...	,, 22	1,621	1,930	+ 309	16½	28,593	+ 3,935
Birmingham Corp. ...	,, 14	16,617	18,033	+ 1,416	15	265,856	+ 17,521
Do. Motor Omnibuses	,, 14	1,028	1,001	— 27	15	13,581	— 723
Blackburn Corp. ...	,, 18	1,300	1,656	+ 356	16⅔	24,467	+ 3,501
Blackpool & Fleetwood	,, 21	1,526	1,487	— 39	28	17,669	— 95
Blackpool Corp. ...	*	...	...	...	...	...	...
Bolton Corporation ...	,, 15	2,788	3,363	+ 575	15	49,744	+ 5,400
Bournemouth Corp. ...	,, 25	2,516	2,863	+ 347	16½	38,890	+ 1,200
Bradford Corporation ...	,, 21	7,066	8,067	+ 1,007	16	121,722	+ 11,745
Brighton Corporation ...	,, 22	1,451	1,714	+ 263	16½	22,396	+ 3,053
Bristol	,, 20	5,182	5,999	+ 817	28	148,974	+ 11,818
British Elec. Federation	*	...	...	...	...	...	...
Burnley Corporation ...	,, 21	1,626	250	— 1,376	...	...	...
Burton-on-Trent Corp.	,, 22	285	374	+ 89	26	4,656	+ 370
Bury Corporation ...	,, 22	1,581	1,765	+ 184	16½	26,970	+ 2,999
Cardiff Corporation ...	*	...	...	...	...	...	...
Chatham & District ...	,, 19	1,336	1,518	+ 182	29	35,925	+ 2,375
Chesterfield Corp. ...	*	...	...	...	...	...	...
Colne Corporation ...	*	...	...	...	...	...	...
Cork Electric	,, 19	589	647	+ 58	29	15,064	+ 935
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation ...	,, 21	1,162	1,258	+ 96	16	18,666	+ 434
Dover Corporation ...	*	...	...	...	...	...	...
Dublin & Lucan ...	June 15	179	198	+ 19	24	3,404	+ 398
Dublin United... ...	July 20	7,034	7,547	+ 513	29	186,861	+ 22,058
Dundee City	,, 18	1,409	1,658	+ 249	9⅔	14,065	+ 1,405
East Ham Corporation	21	1,338	1,436	+ 98	16	22,828	+ 1,633
Exeter Corporation ...	,, 20	438	450	+ 12	16	6,239	+ 71
Glasgow Corporation ...	,, 21	22,252	21,692	— 560	7⅔	194,687	+ 25,713
Glasgow Subway ...	*	...	...	...	...	...	...
Glossop (U.Elec Supp.)	,, 21	144	168	+ 24	29	4,127	+ 244
Halifax Corporation ...	,, 17	2,180	2,640	+ 460	15⅔	38,196	+ 2,903
Do. Motor Omnibuses	,, 17	47	51	+ 4	15⅔	674	+ 62
Hastings & District ...	,, 22	1,266	1,516	+ 250	29	31,285	+ 5,364
Huddersfield Corp. ...	,, 21	2,963	3,330	+ 367	16	51,919	+ 4,530
Hull Corporation ...	,, 21	3,288	3,512	+ 223	21	64,399	+ 3,869
Ilford U.D.C.	,, 21	723	797	+ 74	16	12,111	+ 978
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	,, 21	554	779	+ 225	16	10,198	+ 1,409
Isle of Thanet... ...	,, 21	525	376	— 149	42	11,820	— 468
Kilmarnock Corp. ...	,, 21	187	227	+ 40	9½	1,830	+ 167
Lanarkshire	,, 19	2,478	3,908	+ 1,430	29	76,818	+ 12,374
Lancashire United ...	,, 19	1,810	2,512	+ 702	29	62,124	+ 12,255
Leeds City	,, 21	10,110	11,256	+ 1,146	16	175,459	+ 19,557
Leicester Corporation...	*	...	...	...	...	...	...
Leith Corporation ...	,, 21	951	1,299	+ 348	9⅔	10,416	+ 2,028
Leyton U.D.C.	,, 19	1,706	1,934	+ 228	16	30,435	+ 3,886
Liverpool Corporation	,, 21	14,643	16,589	+ 1,946	28½	434,265	+ 37,159
Llandudno & Colwyn Bay	,, 13	492	475	— 17	32½	8,154	— 650
London County Council	,, 18	48,584	56,543	+ 7,959	15½	854,416	+ 106,681
London Genl. Omnibus...	*	...	...	...	...	...	...
London United... ...	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	,, 19	214	263	+ 49	16	3,775	+ 315
Manchester Corp. ...	,, 21	19,355	20,510	+ 1,155	16	325,372	+ 22,673
Met. Elec. Trays. ...	*	...	...	...	...	...	...
National Steam Car ...	*	...	...	...	...	...	...
Nelson Corporation ...	,, 21	230	219	— 11	16	3,701	+ 215
N'castle-on-Tyne Corp.	,, 21	7,125	8,005	+ 880	16	122,108	+ 18,253
Newport (Mon.) Corp....	*	...	...	...	...	...	...
New St. Helens & Dist.	,, 19	1,030	1,506	+ 476	3	4,401	+ 1,573
Northampton Corp. ...	,, 20	691	852	+ 161	16	12,674	+ 1,538
Nottingham Corp. ...	,, 19	3,888	4,483	+ 595	16	67,031	+ 5,920
Oldham Corporation ...	,, 22	2,806	3,038	+ 232	17	48,082	+ 4,674
Portsmouth Corp. ...	,, 21	3,019	3,285	+ 266	...	...	...
Preston Corporation ...	,, 18	1,029	1,196	+ 167	15½	18,268	+ 1,183
Provincial	,, 21	2,698	2,765	+ 67	42	91,774	+ 389
Reading Corporation ...	,, 19	844	1,076	+ 232	16	15,645	+ 2,618
Rhondda Tramways ...	,, 19	1,338	1,564	+ 226	29	41,428	+ 5,945
Rochdale Corporation...	,, 21	1,915	2,193	+ 278	16	33,617	+ 4,002
Rotherham Corp. ...	,, 25	1,647	1,858	+ 211	16½	29,008	+ 4,665
Salford Corporation ...	,, 23	6,140	6,954	+ 814	16½	106,419	+ 15,745
Sheffield Corporation ...	,, 22	10,990	12,505	+ 1,515	17	199,277	+ 22,165
Southampton Corp. ...	,, 18	1,710	2,101	+ 391	15½	29,815	+ 4,605
Southend-on-Sea Corp.	,, 18	1,019	1,111	+ 92	16	14,573	+ 1,368
South Met. Trays. ...	*	...	...	...	...	...	...
South Shields Corp. ...	,, 21	905	985	+ 80	16	14,921	+ 2,010
Sunderland Corp. ...	,, 22	1,834	1,939	+ 105	16	28,410	+ 2,479
Sunderland District ...	,, 18	647	722	+ 125	38	25,644	+ 3,517
Swindon Corporation ...	,, 4	193	271	+ 78	13½	3,574	+ 888
Torquay Tramways ...	,, 19	690	715	+ 25	29	15,924	+ 1,258
Tyneside Trys. & Tmrds.	,, 4	633	1,233	+ 600	27	20,245	+ 5,642
Wallasey Corporation ...	,, 21	1,539	1,839	+ 300	16½	24,605	+ 2,637
Walsall Corporation ...	,, 14	824	947	+ 123	15	13,069	+ 1,348
Walthamstow U.D. ...	,, 21	1,146	1,284	+ 138	16	20,094	+ 2,691
Warrington Corp. ...	,, 7	466	533	+ 67	10	4,825	+ 230
West Ham Corporation...	,, 19	3,259	3,733	+ 475	15⅞	58,299	+ 6,404
Wigan Corporation ...	,, 19	1,677	1,963	+ 286	7	30,333	+ 3,720
Yorkshire (W. Riding)...	,, 22	1,831	2,250	+ 419	29	58,432	+ 9,287

* Issue of Traffic Returns suspended during the War.

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

BOROUGH OF BERMONDSEY.

ROTARY CONVERTER.

The Borough Council invite tenders for a 500 kw. Rotary Converter. Specification and general conditions and any other details which may be required can be obtained by application to the Borough Electrical Engineer, and on payment of £1 1s., which will be returned on receipt of a bona fide tender. Tenders, endorsed "Converter," must be delivered to the undersigned not later than 12 noon on Friday, September 7, 1917.

FREDK. RYALL,
Town Clerk.

Town Hall, Bermondsey,
August 1, 1917.

POSITIONS VACANT.

CITY OF BIRMINGHAM.

ELECTRIC SUPPLY DEPARTMENT.

APPOINTMENT OF ASSISTANT CONSTRUCTIONAL ENGINEER.

An Assistant Constructional Engineer is required to assist in the preparation of specifications and plans for new buildings and lay-out of new steam and electrical plant, and in superintending the erection and testing of such plant.

He should be familiar with the latest practice as applied to large generating stations, and should preferably have had workshop, central station, and drawing office experience.

Forms of application, which may be obtained from the Secretary of the Electric Supply Department, 14, Dale End, Birmingham, must be filled in by the applicant, stating salary required, and accompanied by copies of not more than three testimonials as to experience, ability and character. These should be sent to the undersigned by August 25, 1917.

R. A. CHATTOCK,
City Electrical Engineer.

14, Dale End,
Birmingham.

SHIFT ENGINEER.

Shift Engineer wanted with experience of steam turbines and three-phase supply. Wages £3 3s. per week of 56 hours. Apply by letter to Generating Station, Stalybridge.

DYNAMO ATTENDANTS.

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SATURDAY, AUGUST 4, 1917.

MOTOR OMNIBUSES AND PETROL SCARCITY.

The accounts of the Eastbourne motor omnibus department for the past financial year are of interest as showing in a striking manner the effects of the petrol shortage upon the services instituted by a municipality which pins its faith entirely upon road motor traffic to the complete exclusion of tramways. The total cost of operation of the vehicles owned by the department has risen to an astonishing degree. Two years ago, it was almost exactly 1*s.* a mile. Last year, it had gone up only about ½*d.*, but the comparatively low figure was due partly to the fact that the payment of instalments on omnibuses purchased out of revenue was almost complete. The rise in operating expenses between 1915 and 1916 was really in the neighbourhood of 2*d.* a mile. This year, the total cost is just over 1*s.* 8*d.* a mile, of which about 3¼*d.* is represented by the payment of instalments and interest on loans. The running expenses, excluding the cost of repairs and maintenance, management, general expenses, interest and instalments, are now slightly higher than the figure including all these items for the year ending March, 1915. This big rise is almost entirely attributable to the petrol shortage, which has led to a reduction in the mileage covered by the department's fleet, amounting to about 40 per cent. of the mileage covered two years ago. This reduction has naturally driven up the standing charges per mile materially, and this effect has been enhanced in no small degree by the increased cost of labour. The running costs have also been pushed up by the fact that the shortage in petrol has been accompanied by a big increase in price. Whereas a concern of this kind before the war could contract for petrol at about 8*d.* per gallon, the cost is now more than three times that amount. The omnibuses remaining in service are by no means all of the newest types, and the consequence is that more than 4½d. a mile goes to the cost of fuel. Naturally, the reduction in mileage run is accompanied by some degree of overcrowding of the vehicles which, despite the specially low terms offered to soldiers, involves a considerable increase in the takings per mile. These now amount to about 1*s.* 6½*d.*, to which must be added rather over 2½*d.* a mile for income from other sources, making a total of about 1*s.* 9*d.* a mile, which is sufficient to meet the expenditure and to leave a balance of about 1*d.* a mile, or, in other words, a net profit on the year's working of about £670, as against a profit of about £4,000 last year. At present several of the old chassis owned by the Corporation are lying idle, owing partly to the difficulty of getting the necessary work of repair and reconstruction effected. It is to be hoped that it will not be long before the whole question of motor fuels is so thoroughly studied and taken in hand as to render impossible at any future date a repetition of the state of affairs that now exists. Petrol is not the only possible fuel, and it is high time that we realised this fact, and made adequate provision in the matter of alternatives. Meanwhile, and unless this is done, the prospects of a general increase in the use of motor omnibuses by municipalities are likely to be jeopardised.

SOUTHAMPTON TRAMWAYS.

In his report for the past year Mr. W. T. Robson, general manager of Southampton Corporation Tramways, gives much interesting information in regard to the undertaking. Referring to the parcel department he says that the personal luggage clause provides a loop-hole which is very largely taken advantage of, for many of the parcels consist of large portmanteaus of a bulky kind that they are unable to charge for, and it is hoped that this handicap will be removed when the Corporation next apply for Parliamentary powers. The arrangement with the Postmaster-General for the conveyance of postmen at an annual charge of £1,200 continues to their advantage, as the services on most routes have been increased during the year. The darkening of the streets during the winter led to an increase in the number of accidents, but a gratifying decrease took place at the beginning of January when headlights were restored to the cars.

During the autumn of 1916 a single track in a portion of St. Deny's Road was relaid, the rails required having been purchased from the Bath Tramways. Owing to the high price obtainable for scrap copper the necessary renewals of the overhead line in various places were carried out at nearly normal cost. Electrically operated points were installed at Portswood Junction, and the satisfactory working of these justifies the consideration of equipping all the main junctions in the same way when opportunity affords. A car embodying many new features was built in the Corporation workshop as an experiment in indicating the type of vehicle most suitable for adoption when new rolling stock becomes once more obtainable. (This car was described in "The Tramway and Railway World" of June 14 last).

The principle of substitution has been adopted during the year with exceedingly satisfactory results in the maintenance of the service. Ten old employees returned from the army as being no longer fit for war service and their places were taken by ten A men who had been granted conditional exemption. The places of almost all conductors have been taken by women, and women car washers have also been employed. The total number of employees serving with the Forces is 183. A roll of honour erected at the central office made from one of the oak timbers of H.M.S. "Southampton" now records the names of eleven tramway men who have laid down their lives in the service of their country.

STREETS MORE DEADLY THAN AIR RAIDS.

The Home Secretary, in the House of Commons on July 30, gave the particulars of the casualties in London arising out of hostile air raids and ordinary street accidents since the commencement of the war, as follows:

	Killed.	Injured.	Total.
Air Raids	366	1,092	1,458
Street Accidents	2,412	70,863	73,275

These figures include all persons killed and injured in air raids in the Metropolitan Police area and the City of London up to the present date.

London Underground Railway Gardens.—Having regard to the national importance of food production this year, in addition to the customary flowers, vegetables of decorative kinds have been included in the Underground Railway station gardens and allotments wherever possible. The annual inspection of the gardens by a committee of the directors assisted by officials of the company has now been made, and so excellent have been the results obtained by the staff that it has been decided to award prizes totalling £27 10*s.* The awards have been distributed as follows:—First prizes of £3 each to Northfields, South Kensington, Walham Green; second prizes of £2 each to Acton Town and Boston Manor; six third prizes of £1 each and 17 fourth prizes of 10*s.* each have also been distributed to other stations. Further prizes aggregating £25 are offered to the company's staff for the best collection of vegetables grown by them either on or off the railway company's property.

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L.C.C. TRAMWAY MATTERS.

The London County Council at their meeting on Tuesday adopted a number of reports from the Highways Committee dealing with tramway matters. These included several recommendations for appointments under the re organisation scheme.

APPOINTMENT OF OFFICERS IN ROLLING STOCK BRANCH.

The scheme of reorganisation approved by the Council on February 20, 1917, (published in our issue of March 15) provided for the appointment of a rolling stock engineer, who would be the officer in charge of the rolling stock branch. The salary assigned to the position is £1,000 increasing by annual increments of £50 to £1,200 a year. In reply to an advertisement thirty-two applications for the appointment were received. The Highways Committee examined the applicants and testimonials, and reported that they did not feel justified in recommending the appointment of any candidate to the position. The principal officer in the rolling stock section is Mr. W. E. Ireland, rolling stock superintendent, whose salary has been £525 a year, and the Committee recommended that, having regard to his experience and qualifications he should, as a temporary arrangement, act as rolling stock engineer. As the position would place upon Mr. Ireland additional duties and increased responsibility, the Committee recommend that he should receive a special allowance of £225 a year. The reorganisation scheme provides that upon the appointment of a rolling stock engineer, the present positions of rolling stock superintendent and assistant rolling stock superintendent should be abolished; a position of rolling stock superintendent with a salary of £400 a year increasing by annual increments of £25 to £600 a year, be established, and a salary of £400, increasing by annual increments of £25 to £600 a year, be assigned to the position of superintendent of the central car repair depot. The Committee proposed that Mr. H. S. May, assistant rolling stock superintendent, should discharge temporarily the duties of rolling stock superintendent in the branch as reorganised, and while thus acting he should receive in addition to his salary of £325 a year, an allowance of £75 a year. It was also recommended that Mr. G. W. Knight, superintendent of the central car repair depot, should act temporarily in the position similarly designated under the reorganisation scheme, and while doing so should receive an allowance of £100 a year in addition to his salary of £300 a year.

OFFICERS IN THE PERMANENT WAY BRANCH.

Under the reorganisation scheme it was proposed that a permanent way engineer should be appointed, who would be the officer in charge of the permanent way branch, with a salary of £800 increasing by annual increments of £50 to £1,000 a year. In reply to an advertisement thirty-nine applications for the position were received, but the Committee reported that they did not feel justified in recommending the appointment of any candidate. They recommended, however, that Mr. J. B. Welling, who has held the position of permanent way engineer since 1901, should be placed in the position of head of the permanent way branch under the reorganisation scheme as a temporary arrangement. His present salary is £600 a year, and the Committee propose that he should now receive an additional allowance of £100 a year. They propose also that Mr. J. R. Wignal, technical assistant in the general section, who is a member of the Institution of Civil Engineers, should be assigned temporarily to the permanent way branch and should receive an allowance of £100 a year in addition to his salary of £340 a year.

CHIEF CLERK OF GENERAL BRANCH.

The reorganisation scheme provides for the appointment of a chief clerk who would hold the position of head of the general branch, and the Committee propose that Mr. W. P. Farquharson, the general assistant, should be appointed. His salary is £600 a year, and at present he has supervision of most of the departmental sections which under the scheme will be organised in the general branch. The proposals for the reorganisation of the general branch the Committee intend to submit to the Council as soon as possible, when the question of making a permanent appointment to the position of chief clerk will be considered.

WAR ALLOWANCES TO MINOR OFFICIALS.

A grant of a war allowance from 2s. 6d. to 7s. a week was authorised by the Council on March 20 to any minor official on the temporary operative staff in the tramways department whose wages together with such allowance would not exceed 80s. a week, provided that the allowance should not be paid to officials who had no men working under their immediate control, and that the amount to be paid to each man should be such as to secure that his position in relation to that of the man of highest grade working under his supervision should be no worse in respect of wages than it was before the war. Since that date most of the subordinate staff in the tramways department have received advances in the nature of war wages or war bonus, with the result that the maximum amount of war wages or war bonus now payable is 12s. a week in the case of employees in the engineering and allied trades, an advance generally of 5s. a week, whilst motormen and conductors receive a war bonus of 9s. a week of six days, an advance of 2s. 6d. a week. As the result of these advances the difference between the wages of some of the minor officials and the wages of the highest grade men working under them is again less than it was before the war. The Committee recommend that the application of the principle approved on March 20, 1917, should be extended to secure that the minor officials should receive corresponding advances to those recently granted to the subordinate staff. It was agreed that the allowance shall be made to men whose wages, together with the allowance, will not exceed 85s. a week. The cost of giving effect to this proposal is estimated at £4,010 during the current financial year, and £4,800 in 1918-19.

PERMANENT WAY WORK.

Arrangements have been made with the Woods-Gilbert British Rail Grinding and Milling Company, Ltd., to undertake as a demonstration of the capabilities of their machines for rail cutting the reduction of the rail checks for one mile of single track in Fulham Palace Road, at the rate of 3½d. a lineal foot of rail treated.

The Highways Committee also reported that arrangements had been made for the repaving of the tramway margins in Gray's Inn Road, between Henry Street and Holy Trinity Church, to be carried out by the St. Pancras Metropolitan Borough Council at a charge to the Council based on the actual recorded cost.

LONDON UNITED TRAMWAY RECONSTRUCTION.

The claim of the London United Tramways, amounting to £2,419, for establishment and supervision charges in connection with the reconstruction of a portion of the company's undertaking in London has been settled by the payment of £1,209 10s.

COAL FOR GREENWICH GENERATING STATION.

A supply of 42,335 tons of coal and 25 tons 3 cwt. of coke for use at Greenwich generating station was purchased during the quarter ended June 30, 1917, at a cost of about £73,000.

DOUBLING OF TRAMWAYS IN WOOLWICH.

The doubling of certain tramways in Woolwich has been completed, and the lines were first used for public traffic on July 2. The Highways Committee reported that the work was completed in eight weeks, and the Ministry of Munitions has expressed its thanks for the rapid way in which the doublings were carried out, intimating that the additional facilities thus afforded will be of great assistance to Woolwich Arsenal.

ACCIDENT CLAIMS.

In respect of accidents 685 claims against the Council have been settled, the total costs amounting to about £6,795. In twelve other cases actions were brought and the verdict was given against the Council, involving a cost of £603. In six other actions the verdict was in favour of the Council, while two actions were withdrawn. From H. M. Government a sum of £3,272 was received in respect of damage to tramway property caused by the explosion at a munitions factory on January 19, 1917.

DELEGATES TO THE MUNICIPAL TRAMWAYS CONFERENCE.

The Council is entitled to appoint two representatives to attend the Conference of the Municipal Tramways Association, to be held at Blackpool, on September 20-21. The Highways Committee suggested that two representatives, in addition to the general manager, who is a member of the executive committee of the association, should be appointed, and it was decided that the chairman and vice-chairman of the Highways Committee, and in the absence of either of them Mr. W. J. Squires, should be appointed, on the understanding that the Council is in no way committed as to its policy in regard to matters discussed at the conference.

All reports relating to tramways were adopted.

THE TRAMWAY STAFF AND FARES.

In reply to a question, Mr. G. H. Hume, chairman of the Highways Committee, said that he had taken every opportunity in the council and out of it to express his conviction that the tramway staff as a whole had served the council well under difficult conditions. In that service, however, as in all others, there were dishonest individuals. It had been variously estimated that the loss to the tramway revenue, owing to the failure to pay fares or other frauds, amounted to from 5 to 15 per cent.

In reply to Mr. J. D. Gilbert, M.P., Mr. Hume said that it was still too early to determine what effect the recent alterations in fares had produced. The Highways Committee had considered the fact that there was a shortage in two weeks of about 600,000 passengers, but no definite conclusion could yet be drawn.

A HALIFAX ACCIDENT.

Colonel Druitt held a Board of Trade inquiry at Halifax on Thursday July 26, regarding the tramway accident at Ambler Thorn on July 15. Rowland Hodgson, the driver of the car which overturned, stated that on the occasion in question he proceeded down the gradient of Ambler Thorn Hill. Just before reaching the end of Roper Lane, he tried to stop by means of the slipper brake, but it failed to pull up the car. He then turned to the hand brake, but it jammed in some way, and he could not bring it to full pressure. The car continued down the hill, and he tried the slipper brake again, but without success. Consequently he resorted to the electric brake, and though he applied it full it only slightly checked the car. When he got to the loop at the bottom of the hill he was travelling at about four miles an hour. The car passed through the loop on to the curve of the single track. He thought his speed slightly increased after entering the loop, although the gradient there was only slight. Suddenly he felt the car leave the curve of the single track, and two or three lengths further on it fell on to its side. Never before had he had any trouble with his brakes, and he could not explain the sudden jamming of the hand brake. He used sand, but it was not effective. The weather had been wet, but it was fine at the time and the rails were not greasy. Evidence was given by Mr. W. J. Galloway, the tramways engineer, and Mr. James Lord, the borough engineer, but neither could explain the cause of the accident. Colonel Druitt will report in due course.

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MISCELLANEOUS NEWS AND NOTES.

Extensions at Walthamstow.—The Treasury have sanctioned the loan of £16,387 for the extension of plant at the electricity works.

The Ministry of Munitions have refused to grant Huddersfield Corporation assistance in arranging for the purchase of electric motor wagons.

Women Drivers at Aberdeen.—Aberdeen Tramways Committee have agreed to put women drivers on the same graduated rates of pay as male motormen.

Increased Cost of Energy.—Croydon Tramway Committee have agreed with the Lighting and Electricity Committee to pay 1¼*d.* per unit—an increase of one farthing.

Railway and Police Recruiting.—The railway companies and the police have supplied their full quota to the 500,000 men asked for by the War Office by the end of July.

Lease of Barking Tramways.—The lease of the Barking tramways between the Broadway and the Boundary Bridge to the East Ham Council has been renewed for a period of three years, at an annual rental of £450.

A Gloucester Service Discontinued.—Gloucester Tramways Committee have resolved that owing to the number of employees called to H.M. Forces, the tramway service between the Cross and Westgate Bridge be discontinued from August 11.

A Blackpool Development.—The lease of the Blackpool, St. Annes and Lytham Tramways Company of the line along part of Lytham Road from Old South Shore Station to Squire's Gate having expired, Blackpool Corporation cars began on July 27 to run on this route.

L.C.C. Cars on Fire.—Two London County Council tramcars, one in the Commercial Road East and the other in Shoreditch High-street, took fire on Thursday morning as the result of defective electric circuits. The passengers alighted, and firemen extinguished the flames.

Tramway Uniforms for Exhibition.—For the collection now being gathered at the London Museum of exhibits relating to the present war, the London County Council have at the request of the museum authorities supplied a woman conductor's costume for exhibition.

Barrow Tramway Tickets.—The system of tickets and stages on the Barrow-in-Furness tramways is being revised. For many years the stages and sections have been printed on the tickets in the form of numbers. To eliminate confusion to the public and the operating staff, the names of streets and of stages of all routes will be printed on the tickets.

Bristol Corporation and the Tramways.—Bristol Corporation are applying to the Board of Trade for an Order under the Special Acts (Extension of Time) Act, 1915, extending for a year from October 31 next, the time during which the Corporation shall be entitled to give notice to exercise the option of purchasing the Bristol tramway undertaking.

Railway Restrictions.—Intimation has been given that the public must be prepared for a further reduction of railway facilities in October, for the exigencies of the military situation have compelled the railway authorities further to restrict their services. The revision of the services is being delayed until October in order to afford facilities to the public, particularly those engaged in war work, to take a reasonable summer holiday.

Burnley Drivers and the Army.—The Burnley Tribunal on July 25 considered an application by the military representative for the review of exemptions granted to 46 tramcar drivers employed by Burnley Corporation. The Tribunal decided that this was not the time to review the cases and dismissed the application, but they were prepared in the future to consider the whole list if necessary.

Daylight Saving in Canada.—The Daylight Saving Bill has been read a second time in the Canadian House of Commons. Sir George Forster, Minister of Trade and Commerce, pointed out the success of similar measures in Great Britain and other countries in Europe. He said that the Bill introduced into the United States Congress would come into effect next year, and he proposed that the Canadian Act should become law at the same time as the American measure. Strong objection to the Bill was taken by rural members, and it is unlikely that it will be given a third reading.

Effects of Rainfall in London.—As a result of the heavy rains, which continued almost without intermission from Sunday morning until Thursday, a slight landslip, involving the fall of overhead wires, occurred on Thursday on the electric lines of the London, Brighton and South Coast Railway. Delay was caused to passenger traffic, which had to be carried on over adjoining lines. Great delay was caused on the London United Tramways by the flooding of the River Wandle, High Street, Colliers Wood, being rendered for a time impassable.

Railwaymen's Wages.—*The Times* states that the Railway Executive has now agreed that the 15*s.* a week war bonus granted to members of the National Union of Railwaymen shall be transferred to wages. An immediate advantage of this permanent arrangement to the men is that the former bonus will now be counted in for overtime and Sunday work. This arrangement is confined to men engaged in the manipulation of traffic, but it is anticipated that the shopmen, who have had a war bonus of 10*s.* a week, will receive similar consideration.

War Bonuses at Keighley.—The award of the arbitrator, Mr. Wm. Robinson in the dispute between Keighley Tramways Committee and the Association of Tramway and Vehicle Workers has been issued. The arbitrator decides that no alteration be made at present in the minimum rates, and that the war bonus for male employees over 21 years of age be increased to 6*s.* per week, and to male employees under 21 years of age there shall be paid 3*s.* per week; that in the case of women of 18 years of age and over 3*s.* 6*d.* per week war bonus be given, and 2*s.* per week in the case of girls under 18 years of age.

Women Inspectors in Leeds.—The Tramways Committee, after considering opposition to their proposal to appoint six women inspectors on the cars, have informed the Tramway and Vehicle Workers' Union that it is not their intention that the women to be appointed shall have any control over the motormen. The male inspectors are to act as heretofore, and the Committee, being quite convinced of the necessity of some increase of inspection and supervision, both in the interests of the public and of the female employees on the tramways, do not consider that there is any reason to vary their resolution of June 18.

The Apportionment of Petrol.—Replying to a question by Mr. Denman in the House of Commons on July 31, Mr. G. Roberts (Parliamentary Secretary to the Board of Trade) said:—The shortage of petrol supplies for civil and industrial needs has necessitated the imposition of restrictions on all classes of users, and complaints have naturally been received of the inadequacy of the quantities of petrol licensed. I am satisfied that the existing organisation is able to control the apportionment of petrol fairly as between different persons and interests. The assistance and advice of local bodies is already obtained where necessary in dealing with the examination of complaints, and in these circumstances I do not think the appointment of local referees is required.

Bradford and Keighley Through Running.—The manager of the Keighley Corporation tramways expresses, in his annual report, the belief that if inter-running between Keighley and Bradford tramways is brought about in the near future the benefits that must accrue to the Keighley Tramways Department by having about nine miles more tramway track added to the system will be so great as to put the department on to a thoroughly satisfactory basis. There are many instances in other parts of the country, he says, to show that a tramway system which is less than six miles in length—if an average is taken over a number of years—can never be made to pay. Immediately, however, it is increased to something approaching twelve miles, things automatically begin to adjust themselves on a paying basis.

Damages against Bristol Tramways Company.—In Bristol County Court, on July 30, a jury awarded Eli Maggs, a carter, £100 damages as against the Bristol Tramways Company in respect of personal injuries. It was stated for the plaintiff that he was driving two horses hauling a load of timber. The horses were in tandem, and he was leading the trace horse with the object of crossing the tramway lines. A tramcar came along, and he signalled and shouted at it to stop, but it struck the trace horse and knocked the plaintiff down. The horses took fright and bolted, and the wheels of the lorry passed over the plaintiff's feet. For the defence it was contended that no blame attached to the tramcar driver, who would have passed safely if the plaintiff had not drawn his trace horse in front of the car. The driver also stated that he did not see the plaintiff put up his hand, nor did he hear him shout.

PERSONAL.

Mr. G. H. Lake has been appointed chief assistant engineer by Derby Electricity Committee.

Mr. J. Christie, manager and engineer of the Brighton Corporation electricity undertaking, has accepted the invitation of Sir Henry Miller, town clerk of Londonderry, to collaborate with the city electrical engineer in connection with the extension scheme for the supply of electrical power to the local shipyard.

Mr. A. P. Trotter, until recently electrical advisor to the Board of Trade, has arranged to enter into partnership with Messrs. Handcock & Dykes, consulting engineers. The partnership will take effect on October 1, 1917, from which date the name of the firm will be Handcock, Dykes and Trotter, the address being 11, Victoria Street, S.W. 1, as at present. Mr. Trotter retired from the Board of Trade under the age limit on August 1. In 1896 he accepted the position of electrical engineer to the Government of the Cape of Good Hope, returning to London in 1899. Mr. Trotter is a B.A. of Cambridge, a member of the Institution of Civil Engineers, the Institution of Mechanical Engineers, and is chairman of the Joint Committee on Illuminating Engineering of the Department of Scientific and Industrial Research.

Hull Men at the Front.—At a meeting of Hull Tramways Committee, the manager stated that he had received a letter from Colonel James Walker in which he mentioned that the tramway men serving under him were doing excellent service. Two of them—Sergeant J. E. Prince and Gunner E. Bacon—had been awarded the Military Medal. It was unanimously agreed that a permanent record be made of the names of the employees who had fallen in the war, and of those who had gained distinctions.

Mr. James Slevin, who some time ago resigned his position as electrical engineer of Wigan, has died at the age of 52. After an apprenticeship at the works of Messrs. Walker Brothers, he served as a draughtsman, subsequently entering the service of Wigan Corporation.

Lieut. James Nelson Payne has died of wounds received in action in East Africa. Previous to the war he was an electrical engineer with Messrs. Bruce, Peebles and Company, by whom he had been selected to take up a position in the Transvaal when the war broke out. He enlisted in the South African Infantry on arrival and received a commission in 1916. He was 24 years of age.

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CONTRACTS AND ORDERS.

The British Insulated and Helsby Cables, Ltd., have an order from Derby Town Council for two miles of overhead wires.

Siemens Brothers and Company, Ltd., are to supply a 1,000 k.w. Rotary Converter at £3,100 to Leicester Corporation.

Glover & Co., Ltd., are the successful tenderers to Leicester Town Council for cables at £3,425.

The D. P. Battery Company are supplying a new battery to the Gloucester electricity department at £933 14*s.*

Norwich Corporation have purchased 3½ ton electric wagons from Ransomes, Sims and Jefferies, Ltd.

Messrs. Vickers, Limited, are overhauling the trucks of twelve of the cars of the Barrow-in-Furness Tramways.

Manns' Patent Steam Cart and Wagon Company, Ltd, have an order for a 5-ton steam tipping wagon for Salford electricity department at £860.

Messrs. Richard Garrett & Sons, of Leiston, have recently supplied an electric vehicle of 3½ tons capacity to the Great Eastern Railway. The wagon is capable of travelling about 40 miles upon one charge of the battery, at an average speed of about 9 miles an hour.

Walthamstow Council have accepted the following tenders:—overhead line material, Fleming, Birkby and Goodall, Ltd.; trolley wire, Frederick Smith and Company, Ltd.; cable, W. T. Henley's Telegraph Works Company, Ltd.; switchgear, the British Thomson-Houston Company, Ltd.

London County Council Tramways.—The Highways Committee of the London County Council have accepted the following tenders:—Pinchin, Johnson and Company, Ltd., baking and air-drying insulating varnish, £65; Jenson and Nicholson, Ltd., finishing insulating varnish, £230; Dick, Kerr and Company Ltd., for the transfer, including dismantling and re-erection of two rotary converters, with transformers, from Greenwich generating station to Woolwich, £265; Heenan and Froude, Ltd., patterns of tramcar trucks of the type principally used on the Council's tramways, £100; Alfred Clare and Company a motor-driven taping machine for re-winding armature coils, £47 14*s.* 4*d.*; Edgar Allen and Company, Ltd., 75 driving wheel centres for tramcars; Hadfields, Ltd., 75 driving wheel centres for tramcars; William Beardmore and Company, Ltd., 100 driving wheel axle forgings for tramcars, at £4 17*s.* 6*d.* each. The following orders in connection with Greenwich generating station have been placed:—Babcock and Wilcox, Ltd., 8,000 stoker links for boilers at £277 15*s.*, and 4,000 links for chain grate stokers at £133 17*s.* 6*d.*; P. and W. Maclellan, Ltd., Glasgow, six top plates for repairing the ash pits, at £4 19*s.* 6*d.* each; W. and T. Avery, Ltd., overhaul of two coal-weighing machines, £28 16*s.* 3*d.*

FINANCIAL REPORTS AND MEETINGS.

Hong Kong Tramway Company announces a dividend of 9 per cent., less tax (interim). Last year the corresponding dividend was 7 per cent.

Bristol Tramways and Carriage Company.—The directors have declared an interim dividend at the rate of 5 per cent. per annum for the past half year.

West Bromwich Corporation Tramways.—For the year 1916-17 the tramways accounts show a deficit of £406 10*s.* 10*d.*, while on the motor omnibuses the deficit on the working account amounts to £675 10*s.* 3*d.*

London and Suburban Traction.—The directors of the London and Suburban Traction Company announce that they do not propose to pay an interim dividend on the preference shares for the half-year to June 30, 1917. Last year 2½ per cent. was paid.

Chester Tramways.—At a meeting of Chester Town Council, Alderman John Jones submitted the annual tramway accounts which showed that the total receipts for 1917 amounted to £13,878, as compared with £13,520 in 1916. The expenditure was £8,085, while the gross surplus was £5,820, as compared with a surplus the previous year of £5,244. The number of passengers carried was 3,282,797, as compared with 3,252,227 in 1916. Alderman Jones said the accounts were the most satisfactory since the Council took the tramways over.

Metropolitan Railway Company.—The result of the working of the Metropolitan Railway Company under Government control for the six months ended June 30 allows the payment of the dividends on the several issues of preference stock and of an interim dividend at the rate of 1 per cent. per annum on the ordinary stock.

Willans and Robinson, Ltd.—Holders of "B" Preference stock of Willans and Robinson have received an offer from Dick, Kerr and Co. of fifty Six per Cent. Cumulative Preference shares and twenty Ordinary shares in that company, or, alternatively, £65 in cash in exchange for each £100 of "B" Preference stock held. The offer will remain open until August 30.

London United Tramways, Ltd.—An adjourned meeting of the holders of the first mortgage debenture stock was held on July 26 to consider the report of the Committee appointed on June 13 last. Mr. W. N. Mattinson, K.C., made a statement concerning the work done by the Committee which had inquired into the financial circumstances of the company. He said he was not in a position to report fully as to all the causes of its present position, but the greatly increased cost of working due to the war was largely responsible for it. There were a number of questions relating to the physical state of the undertaking, the further capital expenditure required to maintain it, its relations with other undertakings, &c., which, in order to understand properly, required an intimate knowledge of tramway construction and working. The Committee had asked for information on a number of specific points, and that had been given them; but the Committee was of opinion that expert advice should be obtained without delay. The only course open to the Committee by which they could hope at once to get first hand the information required was by electing to the board two gentlemen to be nominated by the debenture holders. The present board had, however, declined the Committee's request, but they gave an assurance that they would give every information required by the Committee, and they had also formulated in a somewhat more definite form their tentative proposals. The Committee recommended that the bondholders should authorise them to incur all necessary expenses in obtaining professional and other advice. Mr. Mattinson moved a resolution to this effect, and this was seconded and agreed to.

British Thomson-Houston Company.—At the twenty-second ordinary general meeting of this company in London on July 30, Mr. H. C. Levis, who presided, moved the adoption of the report and accounts for 1916. He said that the total number of the company's employees who had joined His Majesty's forces was 1,309. The number who had fallen in the service of their country was 152. The number holding commissions was 102, many of whom had received decorations. The directors did not recommend the payment of dividends, as it had been deemed wise to use the surplus profits for further depreciation of the goodwill and plant accounts. Last year the goodwill account was depreciated by about £30,000, bringing it down to an even £100,000, and the plant account by £60,000. This year they were able to depreciate the goodwill by an additional £40,000, leaving the net amount £60,000. In regard to the plant, they expended during the year £88,535, but they had made a further depreciation for the year 1915 of £12,093, being an additional amount allowed by the Government, and for the year 1916 they had allocated £103,715, making the total writing off for the year nearly £116,000. Their holdings in shares and debentures of other companies were now valued very conservatively. The profit for the year of £359,364, after deducting all expenses and charges of every kind, excepting only interest, involved heavy payments to the Government, but they were glad that circumstances were such that their contribution could be so large. Last year they made a reserve of £25,000 to take care of possible depreciation in raw material; this year they wrote it back and used it for other depreciations, because it was not required, and due to the fact that it was proposed under the Finance Bill that they should have two years within which to liquidate their stock of raw material, they felt there was little danger of making a loss in this connexion. Their debentures had depreciated in volume by the amount drawn during the year. Their loan from the General Electric Company, of New York, had increased by £57,000, and the amount under sundry creditors, retentions, etc., was up £126,000, having increased from £300,684 to £426,910, but on the other side the item of apparatus finished and in process of manufacture had increased £124,000, sundry debtors, retention moneys, etc., had increased £135,000, and the cash balance had just doubled, increasing from £63,000 to £126,000. It would be interesting could he make a statement relative to the character of the work which they were carrying out, but it was impossible to say more than that practically their entire output was directly or indirectly for Government requirements. Mr. W. C. Lusk seconded the motion and it was agreed to. Messrs. C. A. Coffin and E. W. Rice, the retiring directors, were re-elected.

West Ham Corporation Tramways.—Mr. M. L. Slattery, who was appointed manager in September last, in an interesting report on the work of the department for the year ended March 31, 1917, remarks that it is an unpleasant duty for him in his first report on the undertaking to have to draw special attention to its serious financial position. As will be seen from the appended summary of the accounts, there is a net deficit for the year of £41,198, including the allowance to men on service of £16,670. Considerable items of expenditure on permanent way and car equipments have been charged against this year's revenue which legitimately would be

(*Continued on page* 86.)

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914.	Cash, Aug. 2, or previous	A Week Ago.
5%	5%	AlabamaTraction 5% 1st Mt....	—	67	78½	78½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅝	56/3	56/3
4%	4%	Do. 4% Deb. ...	100	91	69½	68½
4½%	4½%	Do. 4½% Deb. ...	100	98½	73½	73½
5%	5%	Do. 5% Deb. ...	100	96	67	68½
1/-	7d.	Auckland Elec. Trams. Ord....	1	1 3/16	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	89¼	89½
7%	7%	Barcelona Trac. 7% 50 yr. Pr. Lien	100	—	101½	103½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref....	10	11⅜	10	10
4½%	4½%	Do. 4½% Deb.	100	96	77⅜	77⅜
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord.	$100	66	49½	48⅝
$1½	$1½	Do. 6% Cum. Pref. ...	$100	97	90½	90½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref.	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	28	28
6%	5%	Do. Pref. Ord.	100	106	29½	30
5%	5%	Do. 5% Cum. Pref. ...	100	103	50½	51
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb ...	100	96½	53	55
£3*	£3*	Brit. Elec. Trac. Ord. ...	100	—	29½	28⅞
6%	6%	Do. 6% Cum. Part. Pref....	100	—	73½	73½
5%	5%	Do. 5% Deb.	100	92	76½	77
4½%	4½%	Do. 4½% 2nd Deb.... ...	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ...	5	7½	6⅝	6⅝
1/3	1/3	City of B.A. Trams.	5	5½	81/10½	81/10½
5/-	4/-	Dublin United Trams. Ord. ...	10	8	7½	7⅜
6/-	6/-	Do. 6% Pref.	10	12	10½	10½xd
5%	5%	HongKongTrams.5%Mt.Debs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	19/9	19/9
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams. Co. ...	10	10½	9⅞	9⅞
5%	5%	Lisbon Elec.Trams 5% Mt.Debs	100	95	79⅜	79⅜
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	Lond. & Sub. Traction Ord....	1	15/16	1/-	1/7½
6d.	6d.	Do. 5% Pref.	1	5/16	6/1½	6/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	61½	61½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	78⅜	78⅜
4%	4%	Lon. Unt.Trams.4%1st Mt.Db.	100	55	33½	34½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	85/-	85/-
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	69	70
$1½	$1½	Manila Elec. R. R. & Light...	$100	102	62½	62½
4½%	4½%	Met. Elec. Trams. 4½% Deb.	100	85½	70	70
$1½	$1½	Mexico Trams. Common ...	$100	70	25	25
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	35½	38
6%	6%	Do. 6% Mt. Bds.... ...	100	76	29⅜	29⅜
4½%	4½%	MontrealSt.4½%Stg.Dbs(1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ...	100	99	92	92
1/2½*	2/-	National Steam Car	1	15/32	19/9	19/10½
9¾d.*	9¾d.*	New General Traction ...	1	⅛	7/3	7/3
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	13/3½	13/3½
5/-*	6/-*	Para Elec. Rlys. Ord.	5	4½	86/-	80/-
—	—	Pernambuco Try. & Pr. Co. Ord.	—	1	5/9	5/10½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Trac. 5% Pref.	1	13/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ...	1	7/32	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. ... 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	86	86
5%	5%	1st Mt. 5% 50 yr.	100	89½	77½	77½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89	88½
5%	5%	Do. 5% Perp. Deb. ...	100	99½	76	74
3d.	3d.	Singapore Elec. Trams. ...	5/-	¼	5/-	5/-
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93½	93½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	67	67
—	—	Yorks.(W.R.) Elec.Trams. Ord.	5	⅛	18/3	18/6
3/-	3/-	Do. 6% Cum. Pref. ...	5	⅜	86/3	86/3
—	—	Metropolitan Dist. Ord. ...	100	21½	15½	15½
—	—	Undgd. Elec. Rys. of London...	10	21½	31/3	32/6
		Do. "A"	1/-	⅜	5/6	5/3
4½%	4½%	Do. 4½% Bds. of 1933 Rd....	—	99	100½	99½
6%	6%	Do. 6% 1st Cum. In. Db....	100	114	101	101
6%	4%	Do. 6% In. Bonds Rd. ...	—	88½	81½	81

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915-16	Latest Return. 1916-17	Aggregate. Wks.	Aggregate. 1916-17	Increase or Dec.
Anglo-Argentine ...	July 29	£46,346	£46,664	30	£1,535,461	+ £7,070
Auckland ... (29 days)	June 30	21,705	23,593	52	282,694	+ 7,931
Ballarat and Bendigo ...	May 20	3,854	2,991	8	7,602	+ 21
Brazilian Traction Mlrs.	May	7,304,000	7,864,000	21	37,004,000	+3,003,000
Brisbane	June	31,390	32,475	26	193,595	— 755
British Columbia $	June	400,814	373,029	52	5,325,756	+ 262,642
Buenos Aires Lacroze...	June	36,213	38,020	52	464,077	— 25,457
BurmahTram.&LightRs	June	24,027	25,463	48	282,879	+ 29,134
Calcutta ... Rs.	July 28	66,895	70,584	30	2,028,510	+ 20,182
Cape Town	May	...	15,867	21	84,829	...
Carthagena & Herrerias	July	2,371	5,763	30	29,935	+ 11,195
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	...	...	...
East India	June	2,285	1,186	48	20,326	— 2,824
Hong Kong $	June 9	12,830	13,376	23	302,269	— 8,134
Kalgoorlie	Apr.	2,553	2,705	17	10,101	+ 585
La Plata	July	3,910	3,875	30	29,019	— 816
Lima	May	33,966	35,321	21	181,869	+ 13,098
Lisbon ... ... Escu.	May	...	233,765	...	...	...
Madras ... (2 weeks)Rs.	July 15	34,007	36,083	28	444,499	+ 40,150
Manila ... ... $	May	53,900	61,500	...	...	...
Manaos ... ... Rs.	Apr.	...	160,545	...	...	...
Melbourne	Mar.	63,000	64,506	13	186,321	— 9,179
Montevideo	June	25,300	27,458	35	242,796	— 1,728
Pernambuco	July 29	2,917	3,892	30	110,937	+ 21,829
Peruvian ... $	June	929,500	965,420	52	11,128,092	+1,364,595
Port Elizabeth ...	May	...	3,494	21	19,877	...
Rangoon	June	4,205	4,383	26	29,620	+ 1,039
Shanghai ... $	Apr. 25	25,305	12,610	...	...	...
Singapore ... $	June 9	13,189	13,527	23	301,525	+ 17,199
Toronto ... ... $	June	884,491	984,529	26	5,873,584	+ 538,385
Winnipeg	June	254,686	254,226	26	1,673,370	— 28 104

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1916	Latest Return. 1917	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917.	Incr. or Dec.
Aberdare U.D.C. ...	July 24	410	484	+ 74	16	£7,044	+ £722
Aberdeen Corporation	„ 25	2,267	2,319	+ 52	8	17,967	+ 2,772
Accrington Corp. ...	*	...	...	...	...	...	...
Ayr Corporation ...	„ 21	710	823	+ 112	11	6,394	+ 1,327
Belfast City	„ 20	5,482	5,784	+ 302	16	97,963	+ 8,562
Birkenhead Corp. ...	„ 29	1,673	1,955	+ 282	17½	30,548	+ 4,217
Birmingham Corp. ...	„ 28	17,152	18,840	+1,688	17	302,373	+ 20,865
Do. Motor Omnibuses	„ 28	1,173	1,069	— 104	17	15,640	+ 887
Blackburn Corp. ...	„ 25	1,649	1,676	+ 27	17⅔	26,144	+ 3,599
Blackpool & Fleetwood	„ 28	1,822	1,692	— 130	29	19,361	— 226
Blackpool Corp. ...	*	...	...	...	...	...	...
Bolton Corporation ...	„ 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corp. ...	Aug. 1	2,775	2,620	— 155	17¼	41,510	+ 1,045
Bradford Corporation ..	July 21	7,060	8,067	+1,007	16	121,722	+ 11,745
Brighton Corporation...	„ 29	1,542	1,787	+ 245	17½	24,183	+ 3,298
Bristol	„ 27	5,574	6,172	+ 598	29	155 146	+ 12,416
British Elec. Federation	*	...	...	...	...	...	...
Burnley Corporation ...	„ 28	1,798	1,285	— 513	...	...	...
Burton-on-Trent Corp.	„ 29	291	322	+ 31	17	4,978	+ 401
Bury Corporation ...	„ 28	1,555	1,763	+ 209	17½	28,733	+ 3,208
Cardiff Corporation ...	*	...	...	...	...	...	...
Chatham & District ...	„ 26	1,396	1,547	+ 151	30	37,472	+ 2,525
Chesterfield Corp. ...	*	...	...	...	...	...	...
Colne Corporation ...	*	...	...	...	...	...	...
Cork Electric	„ 26	619	680	+ 61	30	15,744	+ 997
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation ...	„ 28	1,255	1,290	+ 35	17	19,957	+ 469
Dover Corporation ...	*	...	...	...	...	...	...
Dublin & Lucan ...	June 15	179	198	+ 19	24	3,404	+ 396
Dublin United... ...	July 27	7,629	7,723	+ 94	30	194,584	+ 22,120
Dundee City	„ 25	1,480	1,837	+ 357	102	15,903	+ 1,762
East Ham Corporation	28	1,399	1,490	+ 91	17	24,318	+ 1,723
Exeter Corporation ...	„ 27	467	465	— 2	17	6,704	+ 69
Glasgow Corporation ...	„ 28	23,153	24,041	+ 888	85	218,728	+ 26,190
Glasgow Subway ...	*	...	...	...	...	...	...
Glossop (U.Elec Supp.)	„ 28	161	173	+ 12	30	4,301	+ 256
Halifax Corporation ...	„ 24	2,630	2,669	+ 39	16⅔	40,866	+ 2,941
Do. Motor Omnibuses	„ 24	55	54	— 1	16⅔	728	— 63
Hastings & District ...	„ 29	1,322	1,599	+ 277	30	32,884	+ 5,641
Huddersfield Corp. ...	„ 28	3,381	3,610	+ 229	17	55,529	+ 4,759
Hull Corporation ...	„ 28	3,238	3,607	+ 368	17	56,806	+ 3,037
Ilford U.D.C.	„ 28	741	837	+ 96	17	12,948	+ 1,073
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	„ 21	554	779	+ 225	17	10,198	+ 1,409
Isle of Thanet... ...	„ 28	573	422	— 151	43	12,242	— 609
Kilmarnock Corp. ...	„ 28	229	247	+ 18	10½	2,076	+ 185
Lanarkshire	„ 26	2,675	3,096	+ 421	30	79,915	+ 12,795
Lancashire United ...	„ 25	2,163	2,765	+ 602	30	64,897	+ 12,879
Leeds City	„ 28	10,905	11,763	+ 858	17	187,223	+ 20,366
Leicester Corporation...	*	...	...	...	...	...	...
Leith Corporation ...	„ 28	1,043	1,318	+ 275	10⅔	11,734	+ 2,304
Leyton U.D.C.	„ 26	1,828	2,000	+ 172	17	32,435	+ 4,058
Liverpool Corporation	„ 28	15,665	17,251	+1,586	29⅔	451,516	+ 38,744
Llandudno&Colwyn Bay	„ 20	554	524	— 30	33½	8,678	— 680
London County Council	Aug. 1	52,598	55,757	+ 3,159	17½	968,415	+ 117,526
London Genl. Omnibus...	*	...	...	...	...	...	...
London United... ...	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	July 26	226	264	+ 38	17	4,039	+ 354
Manchester Corp. ...	„ 28	20,411	21,308	+ 897	17	346,680	+ 23,476
Met. Elec. Trays. ...	*	...	...	...	...	...	...
National Steam Car ...	*	...	...	...	...	...	...
Nelson Corporation ...	„ 28	257	289	+ 32	17	3,990	+ 246
N'castle-on-Tyne Corp.	„ 28	7,370	8,216	+ 846	17	130,379	+ 19,159
Newport (Mon.) Corp....	*	...	...	...	...	...	...
New St. Helens & Dist.	„ 25	1,289	1,474	+ 185	4	5,875	+ 1,772
Northampton Corp. ...	„ 27	737	861	+ 124	17	13,535	+ 1,663
Nottingham Corp. ...	„ 26	4,150	4,631	+ 481	17	71,662	+ 6,401
Oldham Corporation ...	„ 29	2,702	2,888	+ 186	18	50,970	+ 4,861
Portsmouth Corp. ...	„ 28	3,319	3,530	+ 211	...	...	...
Preston Corporation ...	„ 25	1,132	1,256	+ 124	16½	19,524	+ 1,307
Provincial	„ 28	2,913	3,050	+ 137	43	94,824	+ 558
Reading Corporation ...	„ 19	844	1,076	+ 232	16	15,645	+ 2,618
Rhondda Tramways ...	„ 26	1,424	1,608	+ 184	30	43,037	+ 6,129
Rochdale Corporation...	„ 28	2,085	2,292	+ 207	17	35,909	+ 4,209
Rotherham Corp. ...	Aug. 1	1,660	1,764	+ 104	17⅝	30,772	+ 4,768
Salford Corporation ...	July 30	5,973	6,589	+ 616	17⅔	113,008	+ 16,328
Sheffield Corporation ...	„ 29	10,992	12,150	+ 1,158	18	211,427	+ 23,323
Southampton Corp. ...	„ 25	1,838	2,179	+ 341	16½	31,995	+ 4,947
Southend-on-Sea Corp.	„ 25	1,155	1,214	+ 59	17	15,787	+ 1,417
South Met. Trays. ...	*	...	...	...	...	...	...
South Shields Corp. ...	„ 21	905	985	+ 80	16	14,921	+ 2,010
Sunderland Corp. ...	„ 29	1,985	2,033	+ 48	17	30,443	+ 2,527
Sunderland District ...	„ 25	780	942	+ 162	39	26,586	+ 3,680
Swindon Corporation ...	„ 4	193	271	+ 78	13⅓	3,574	+ 888
Torquay Tramways ...	„ 26	760	802	+ 42	30	16,726	+ 1,300
Tyneside Trys. & Tmrds.	„ 18	703	1,005	+ 302	3	2,508	+ 641
Wallasey Corporation ...	„ 28	1,779	2,059	+ 280	17½	26,663	+ 2,917
Walsall Corporation ...	„ 28	859	984	+ 125	16	15,926	+ 1,612
Walthamstow U.D. ...	„ 28	1,274	1,421	+ 146	17	21,515	+ 2,845
Warrington Corp. ...	„ 26	516	552	+ 36	17	8,726	+ 586
West Ham Corporation...	„ 26	3,386	3,792	+ 406	16⅔	62,090	+ 6,809
Wigan Corporation ...	„ 26	1,769	2,043	+ 274	17	32,377	+ 3,984
Yorkshire (W. Riding)...	„ 29	1,980	2,332	+ 352	30	60,764	+ 9,639

* Issue of Traffic Returns suspended during the War.

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chargeable to the reserve and renewals fund if such a fund had existed. Mr. Slattery observes that adequate provision should have been made in past years to meet this abnormal expenditure when the maintenance charges were low. Experience has proved that the effective life of permanent way and cars is considerably below the statutory loan periods, and a sum should have been set aside annually equivalent to the difference between the assumed life and the loan period. Notwithstanding the heavy expenditure on track and cars during the past two years, which is still continuing, the time is not far distant when reconstruction must be undertaken, and consideration must be given to the means for meeting the required expenditure. The increased revenue accruing from the recent alteration in fares will not do more than meet the cost of concessions recently granted and the abnormal increases in the cost of materials generally. Much difficulty has been experienced in maintaining the services owing to the constant depletion of the staff and the difficulty in obtaining material. Women conductors have been engaged to replace conductors who had been called to the colours. Up to March 31, 1917, 430 employées, equal to more than 58 per cent. of the normal staff, had joined the Forces, and 16 employées have given their lives in defence of the country. An allowance is made to those employées who joined His Majesty's Forces equal to their civil wages less service pay, and in the case of married men less also the separation allowance. The cost to the department of the allowances for the past financial year amounted to £16,670, or a total of £36,019 since the commencement of the war.

Year ended March 31.	1917	1916	1915	1914	1913
	£	£	£	£	£
Traffic receipts	165,488	160,509	147,703	142,934	137,765
Other receipts	824	3,959	6,334	3,155	3,994
Total revenue	166,312	164,558	154,037	145,189	140,829
Working expenses	149,989	124,926	110,936	126,174	110,050
Profit on working	£16,323	£39,632	£34,101	£19,015	£30,779
	£	£	£	£	£
Allowance to men on service	16,670	13,318	6,931	20,848	20,840
Interest and income tax ...	16,150	18,457	20,348	12,398	12,309
Sinking fund	12,707	12,738	12,738	690	955
Renewals and motors, etc.	8,994	5,581	690		
	57,521	50,094	30,859	33,536	34,167
Deduct profit on working	16,323	39,632	34,101	19,015	30,779
Deficit for the year ...	£41,198	£10,462	£5,758	£14,521	£3,388
Passengers carried... ...	47,326,816	46,734,440	42,667,561	41,152,501	40,200,347
Fare per passenger ...	·840d.	·824d.	·852d.	·828d.	·822d.
Car mileage...	3,650,855	3,645,165	3,760,361	3,756,354	3,544,292
Units per car mile... ...	1·03	1·01	1·06	1·85	1·72
Power cost per car mile ...	1·546d.	1·315d.	1·23d.	1·35d.	1·31d.
Receipts per car mile ...	10·99d.	10·94d.	9·83d.	9·27d.	9·53d.
Expenses per car mile ...	9·86d.	8·22d.	7·05d.	8·06d.	7·45d.
Ratio of expenses	90%	76%	78%	88%	78%
Total track mileage ...	30	30	30	30	30
Number of cars in stock ...	118	118	118	118	118

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended July 21 give total receipts of £200,460, or £20,486 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £93 10s. 10d. per mile of single track, and last year at the rate of £83 10s. 7d., thus showing an increase for the week of £9 11s. 3d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

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Why joints fail—Dished or hammered joints—Movement at joints.

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CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

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Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

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Removal of tracks—Temporary tracks.

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THE

Tramway & Railway World

Vol. XLII. No. 7] LONDON, SATURDAY, AUGUST 11, 1917 [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

PORTSMOUTH CORPORATION TRAMWAYS COMMITTEE.

The Tramways Committee of the above Corporation invite Tenders for the supply of the undermentioned goods from October 1, 1917, to March 31, 1918.

Section A.—Ballast, Sand and Grit.
Section B.—Portland Cement (British manufacture preferred).
Section C.—Brooms and Brushes.
Section D.—Oils (not lubricating), Chemicals, Sheet Glass, etc.
Section E.—Smith's Coal and Coke.
Section F.—Timber.
Section H.—Brake Blocks.
Section I.—Engine Packings, Asbestos Goods, etc.
Section J.—General Ironmongery (not including tools).
Section M.—Steel Tramway Tyres.
Section O.—Wood Paving Blocks (Karri, Jarrah and Creosoted).
Section P.—Car Repair Stores.
Section Q.—Insulating Materials, Lamps and Motor Windings.
Section R.—Overhead Line Materials.
Section S.—Lubricating Oils, Greases, etc.
Section T.—Chandlery, etc.
Section U.—Castings and Machined Parts.

The specification and form of tender may be obtained upon application to the Engineer, Mr. V. G. Lironi, M.I.M.E., A.M.I.E.E., Engineer's Office, Vivash Road, Fratton, Portsmouth.

Tenders marked "Tender for....," to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on Tuesday, August 28, 1917.

The form of tender must include a declaration that the person making the tender pays the rates of wages and observes the hours of labour and conditions contained in the Corporation Fair Wages Clause.

The Committee do not bind themselves to accept the lowest or any tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth,
August 8, 1917.

STOCKPORT CORPORATION TRAMWAYS.

ADVERTISING ON CARS.

Tenders are invited for the Advertising Rights, for a period of five years, upon the tramcars of the Corporation running within the County Borough of Stockport and outside districts.

Forms of tender and contract may be obtained on application to the undersigned.

Tenders endorsed "Tramcar Advertising" to be delivered at this office on or before August 25, 1917.

A. T. EARDLEY,
Tramway Manager.

Mersey Square, Stockport,
July 17, 1917.

COUNTY BOROUGH OF BOOTLE.

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The Corporation invite designs and tenders from specialist firms for the erection and completion of an Overhead Coal Bunker in the present boiler house. The coal bunker to be constructed in reinforced concrete, and to hold at least 400 tons of coal.

Firms desiring to tender may obtain further particulars, together with detail drawings of the present boiler house, on application being made to the Borough Engineer, Town Hall, Bootle.

Designs and sealed Tenders, endorsed "Overhead Coal Bunker," to be delivered to the undersigned not later than 12 noon on Wednesday, September 12.

The lowest or any tender will not necessarily be accepted.

J. SPENCER TUMILTY,
Town Clerk.

POSITIONS VACANT.

ARMATURE WINDER.

Armature Winder wanted with experience in repair and rewinding of tramway motors. Rate 1s. 0½d. per hour. Must be ineligible for H.M. Forces and able to obtain a leaving certificate if necessary. Apply, with copies of references, to T. R. WHITEHEAD, General Manager, Corporation Tramways, Coventry.

FITTER.

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For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

WANTED.—Copies of the TRAMWAY AND RAILWAY WORLD of January 11, 1912; January 1 and 13, 1916; April 13, 1916; May 11, 1916; and October 9, 1916.—Reply to Box 12, The TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

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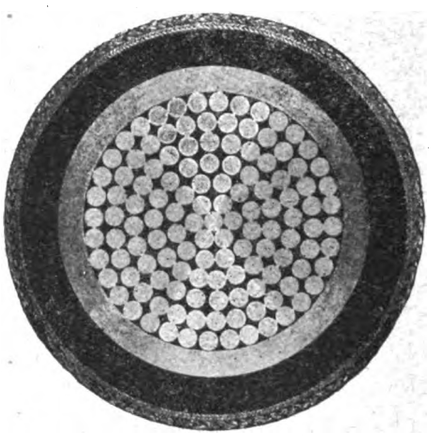

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SATURDAY, AUGUST 11, 1917.

WAR BONUSES AS WAGES.

During the discussion at the Municipal Tramways Association Conference of 1915 on the advisability of increased fares, one of the speakers asked if the delegates did not believe that war bonuses would remain in existence after peace had been restored. There is a likelihood of this becoming an accomplished fact before the long-looked-for era arrives; for last week the railway companies agreed to allow their men's bonus of 15s. per week to be regarded as wages. Naturally enough, an announcement has since been made that it is expected the other trade unions will now lodge claims for similar treatment, that the question has already been discussed, and that in all probability concerted action will follow. No body of tramway employees has yet obtained the amount of bonus that they desire to gain, and that being so they will not find it a difficult matter to urge the adoption of treatment similar to that just accorded by the railway companies. It is necessary, however, to point out that there is a substantial difference between railway and tramway employees. Speaking on Sunday last, Mr. J. H. Thomas, Secretary of the National Railway Union, stated that the bonus resulted in some railwaymen receiving less pay for Sunday labour than for week-day work, and that in addition to the bonus of 15s. being treated as a war wage from August 1, it will carry with it the enhanced value for overtime and Sunday duty. The existence of such a disadvantage as has apparently been attached to railway employment hitherto, has never been urged in the case of tramway workers. Still, they may claim that even in the best instances their bonus is 5s. a week less than the flat rate of the railway men, but against this there is a set off in that the average pay for tramway work is above the average of the railway worker. As regards the duration of the bonuses, it is admitted on all hands that they have been granted in order to meet the increased cost of living due to the war, and all authorities who have been studying such matters in relation to the after-war period, agree that there is not likely to be any diminution in the cost of necessaries. It has even been admitted this week, in connection with housing schemes, that when additional dwellings for the workers are erected after the war the enhanced cost of materials must certainly lead to an increased rent being asked for the new accommodation. As a set off it has been urged that the bonuses now paid should become permanent. What tramway authorities have to consider, when they are called upon to meet the claim for the conversion of the bonus into wages is, how far the concession will go towards securing harmonious working and a release from the never-ending demands for improved conditions. An agreement on those lines should not be an impossible achievement, while leaving the employees freedom of action in the event of further increases of the prices of commodities as certified by the Board of Trade reports.

TRANSFER TICKETS AND FARES.

By a large majority Cardiff Corporation have adopted a motion by Sir John Courtis, chairman of the Tramway Committee, authorising the general manager to withdraw the transfer ticket system for the present, "owing to the great increase in the cost of material and wages and the shortness of staff." Sir John stated that this action was necessary in view of the financial position. The cars were crowded, and people who used transfer tickets only took short rides, often to the exclusion of the long distance passenger. Statistics for the three months ending June 30 showed over the corresponding period of last year—increased income £4,316, increased expenditure £5,191, a net loss of £875. Hundreds of pounds a year were being lost because there were not enough conductors to collect the fares.

For the third time Leicester Corporation on July 31 considered the question of revising fares. Ald. Flint, chairman of the Tramways Committee, in introducing the Committee's unanimous recommendations for making the penny stages approximately a mile in length, and the creation of halfpenny stages, admitted that the shortened penny stages showed some anomalies, which they were trying to meet as far as possible by the halfpenny stages. The latter were an experiment, urged upon the committee by many members of the Council and also by people outside. The manager estimated that the income would have to be increased by £22,000 to meet the extra charge of war bonus, wages and materials. Ald. Banton, vice-chairman of the Committee, pointed out that the success of a halfpenny stage depended upon frequently running cars and a sufficiently dense population, and he was doubtful whether the scheme would answer. The Committee were economising by not running so many cars in slack times, and they hoped to save £3,000 this year in this way.

WOMEN INSPECTORS AT LEEDS.

STRANGE RESENTMENT OF WOMEN CONDUCTORS.

Women conductors on the Leeds tramways objected to the appointment of six women inspectors, who began duty on August 3, and threatened to hold up the entire service unless the women inspectors were withdrawn. They contended that the appointments were unnecessary, and that if more inspectors were needed they should have been chosen from old servants on the cars. The men took sides with the women. Alderman R. A. Smithson, chairman of the Tramways Committee, at the last Council meeting had said that the men referred to were not suitable for the particular duties; and the Tramway Committee have not felt justified in acceding to the demand of the union that the women inspectors should be "immediately withdrawn." From the Tramways Office the following official statement upon the position was made on August 6:—

"In conformity with the promise to call a Tramways Committee meeting at the earliest possible opportunity, every effort has been made to get in touch with the members. This being the holiday season, however, and many members having left town, so far the Chairman has only been able to get into touch with two other members of the Committee. In addition to the difficulty arising from the holidays, the Electricity Committee, upon which there are a considerable number of members of the Tramways Committee, have arranged to visit Stafford on Wednesday and Thursday for the inspection of new plant. It seems probable, therefore, that it will be impossible to get anything like a full meeting of the Committee before Friday next. This further time will also permit the members of the union, if they desire to make further representations, an opportunity to elaborate their case."

On Monday some of the women conductors declined to submit their way-bills for checking.

As a result of negotiations it was arranged that a conference should be held on Friday, the Tramways Committee to be represented by the chairman, (Mr. R. A. Smithson), the general manager (Mr. J. B. Hamilton), and the traffic superintendent, (Mr. A. Daggett), with two representatives of the Union. The object of the conference is to determine whether there are men in the tramways department available and qualified to act as ticket inspectors.

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MUNICIPAL TRAMWAYS CONFERENCE.

ANNUAL CONFERENCE.

As previously announced, the annual conference of the Municipal Tramways Association will be held at Blackpool on Thursday and Friday, September 20 and 21. The following programme of discussions has now been arranged:—

"Principles to adopt to ensure the highest net earning capacity," Messrs. G. W. Holford (general manager of Salford Corporation Tramways), J. Barnard (general manager, Bolton Corporation Tramways), P. Priestly (general manager, Oldham Corporation Tramways).

"Rules of the footpath," Mr. James Dalrymple, general manager, Glasgow Corporation Tramways.

"Differentiation in tramway fares," Mr. W. Murray, manager, Walthamstow Council Tramways.

"Development of tramways." (The name of the opener of the discussion has not yet been communicated).

One day only will be devoted to the discussion, and the annual business meeting will take place on Friday morning. The headquarters of the Association will be at the Savoy Hydro, North Shore, Blackpool, where the meetings will be held. As at previous conferences since the beginning of the war, there will be no public functions or entertainments.

DARTFORD CARS AND CAR SHED DESTROYED.

The car sheds and cars of the Dartford Tramway Company were destroyed by fire on Tuesday morning, August 7. The fire was first observed about 3 a.m., and although the fire brigade arrived within a few minutes the whole building and its contents were demolished. Of the twelve cars, nothing remained but a tangled mass of metal. The origin of the fire is unknown. The night man, who left at midnight, after the last car had been run in, states that the buildings were then closed and the electric current shut off. Until recently a military guard was stationed at the car sheds, as the cars carry great numbers of munition workers. Great inconvenience was caused by the destruction of the cars, but arrangements were made for a number of London County Council cars to be sent into the district. The Dartford tramways are owned by the Urban Council, which supplies current for the cars; but the undertaking is leased to and worked by Messrs. Balfour, Beatty and Co. under an agreement expiring in 1921.

AIRCRAFT IN MAIL SERVICE.

Attention is so much absorbed by the war that business men may be pardoned if they have failed to realise what immense strides have been made in aircraft design and manufacture since the outbreak of hostilities. The facts are fully known to comparatively few, but they justify the liveliest anticipation of prodigious commercial developments when peace has returned. Acceleration of foreign postal service to a degree scarcely dreamt of a few years ago is assured, and the conditions of oversea trade will, as a consequence, undergo great changes.

Anyone who wishes to know something of what feats have already been accomplished should read an article specially contributed by Mr. C. G. Grey to *Production*, the organ of the British Empire Producers' Organisation. Mr. Grey is a recognised authority on aeronautics, and he asserts that mails can now be carried by aeroplane to India in three days and to Australia in five, while Paris can be brought within 2½ hours from London, Rome 12, and Petrograd 24.

The possibilities of the land-going type may be gauged from the fact that several months ago one of our big war aeroplanes flew from an aerodrome in Kent, not very far from London, to Paris in considerably less than three hours, carrying the pilot and six passengers and 900 lbs. of luggage, which is pretty nearly equal to ordinary first-class railway allowance. Over a year ago an earlier and less efficient machine of the same type lifted a pilot and 21 passengers to a height of 7,000 ft. with ease. More recently a later development of the type took two pilots and four mechanics from London to Rome—and beyond. They did not hurry, as they were only touring, but the first stop was Paris, the next Marseilles, the next Pisa, and the next Rome, and they carried all their baggage for a campaign, besides any quantity of spare parts for their engines and the aeroplane itself. The big seaplanes are no less convincing. When one goes aboard one of these which has just returned from a patrol of eight or nine hours over the sea, and finds a breakfast-table laid for four, the breakfast having obviously been eaten while on patrol as the machine has just alighted; and when one sees a couple of comfortable bunks in which someone has obviously been sleeping, as the beds have not yet been made up, one begins to see the possibilities of the ocean-going aeroplane.

An Unusual Cause of Labour Trouble.—It is reported that the Barrow-in-Furness tramway service was stopped for several hours on August 5, the employees ceasing work as a protest against the treatment of the late manager of the tramways by the British Electric Traction Company. A local committee was formed and a request was drawn up asking for an explanation of matters within twenty-one days.

MISCELLANEOUS NEWS AND NOTES.

Long Distance Runs on Coal Gas.—Coal gas is used for the propulsion of the whole of the motor fleet of Chapman and Sons, of Eastbourne. Twice a week chars-a-bancs are run to London, returning on the next day. The gas holders are refilled at certain points without lengthy delay.

Sheffield Objection to Yorkshire Coal.—Representations have been made to the Coal Controller by Sheffield steel manufacturers against his proposal to allocate Yorkshire coal to that city, in place of Notts and Derby coal hitherto used. It is claimed that the steel works must have the latter coal, which has great heating capacity, if their output is not to be adversely affected.

Manchester Traffic Problem.—The special committee of Manchester Corporation who are considering the question of traffic congestion, on August 1 had under consideration a scheme that will involve an expenditure of £1,000,000 to £1,500,000. This provides for the construction of new tramway tracks in the central area, the widening of new streets by the demolition of property, and the laying out of several tramway terminals.

Supply of Energy at Birmingham.—Alderman Jephcott, chairman of the Electric Supply Committee, has informed Birmingham Corporation that while the Government would not sanction the erection of the proposed permanent power station, the committee were doing their best to prevent any interruption of the tramway services by having the machinery put into the best possible condition, and by not taking more consumers on than they could see their way to supply. The Corporation have sanctioned an all-round increase of 15 per cent. in the charges to consumers.

The Control of Road Stone Quarries.—The Minister of Munitions has issued an Order revoking the Orders of May 9, 1917, and June 14, 1917, whereby, under Regulation 9 gg of the Defence of the Realm Regulations, he assumed control and possession, subject to a period of suspension and to certain exceptions, of all road stone quarries in the United Kingdom. The revocation was made with a view to an Order being made by the Army Council, and this Order, which was issued on August 7, practically re-enacts the provisions of the previous Orders.

Sydney Tramway Traffic Stopped.—The Sydney (N.S.W.) tramway employees have struck work, and the services on all the tramways were stopped on August 7. A few tramcars and trains manned by employees who remain loyal were run at long intervals. A Reuter's telegram states that the Government and the Unions are evidently determined to fight to the bitter end. According to information supplied by Reuter's Agency, the railway strike broke out in the State Railway workshops in New South Wales owing to the introduction of a new system of "time cards." The trouble spread by means of sympathetic strikes, which were decided upon by the unions of other railway workers as well as tramway men.

Increasing Difficulties at Thanet.—Before the Broadstairs Tribunal last week the general manager of the Isle of Thanet Tramways Company definitely stated that if more men were taken from the service, there was a possibility that the tramcars would have to cease running. This has caused considerable anxiety in the district. A local newspaper remarks that the restrictions on travelling in the area are already sufficiently heavy to cause the authorities to consider seriously if any further curtailment can be allowed. The tram service is of the utmost importance to the whole of the community, including the military authorities, and its suspension would be a severe blow.

Overhead Equipment Transferred to Tramway Department.—Alderman Tyrrell, chairman of the Belfast Tramways Committee, drew attention at the Council meeting on August 1 to the recommendation that the control and management of the overhead equipment of the tramways be transferred from the electrical engineer to the general manager of the tramways. The Committee were unanimous in the recommendation, believing that the rearrangement would avoid the overlapping, confusion, and waste which usually results from dual control. The Committee were convinced that the change, which was due in no way to any inefficient management on the part of the electrical engineer, would be a good thing for both departments. The proposal was approved by the Council.

The Cancellation of Petrol Licences.—In connection with the Order issued by the Petrol Controller, cancelling petrol licences issued in respect of private motor cycles and motor cars for periods prior to April and May last, the Automobile Association and Motor Union has addressed a protest to the Board of Trade. It states that many motorists, relying upon the assurance of the Petrol Control Committee that they were entitled to do so, have saved their small allowances for consumption during their annual vacations, also for the bank holiday. They have been encouraged to do so by the answer given in the House of Commons on July 16 last by Mr. G Roberts to Mr. Cathcart Wason. It is submitted that sudden cancellation of unexhausted petrol licences inflicts unmerited hardship upon those who have conscientiously supported the Government by economising in petrol, while others have regularly drawn their allowances for business or pleasure purposes.

Freedom from Accident Shield.—The London General Omnibus Company has presented a silver challenge shield, to be held each year by the garage with the best record for immunity from accidents, and, on August 3, this was presented to the staff of the Mortlake garage for their 1916 record. Mr. H. E. Blain, operating manager, presided, and, in making the presentation, referred to the fact that, as a result of increased attention to the avoidance of accidents, and to "Safety" Campaign which had been conducted, the percentage of accidents had been reduced by over 50 since 1913. Mortlake garage had had the best record for the last three years, but was being very closely pressed by several of the others, and it

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was exceedingly doubtful who would be the holders of the shield for the current year. Speeches were delivered by Messrs. Murray Griffith, a director of the District Railway, G. J. Shave, manager for maintenance, and J. P. Thomas, general superintendent, and an excellent musical programme was rendered.

The Tramways and Light Railways Association.—The *Journal* for July contains the reply of Mr. Arthur Norton to the discussion on his paper on "The Manufacture, Life and Maintenance of Tramway Car Tires," read at the congress on June 29.

Manufacturers and Brass Borings.—The Ministry of Munitions announces that in future manufacturers will not be permitted to obtain supplies of brass turnings or borings of any kind, or of brass scrap, arising from the manufacture of munitions, from any source except the Ministry. All inquiries must be sent to 8, Northumberland Avenue, London, W.C.2, under reference A.M. 2-S.

Hydraulic Tire Presses.—Mr. Leo Swain, manager of the solid tire department of Messrs. George Spencer, Moulton and Company, Ltd., 239, Deansgate, Manchester, has undertaken at the request of the Solid Tire Committee of the British Rubber Tire Manufacturers' Association, to prepare an up-to-date list for publication of firms in the United Kingdom who have installed hydraulic presses, and will undertake efficiently to press on and off solid band tires of any make. In order to make the list complete, Mr. Swain will be glad if such of our readers as have hydraulic presses will advise him if they have any reason to think that their names do not appear on the last list prepared. Information should be sent to Mr. Leo Swain, 239, Deansgate, Manchester, not later than Saturday, August 25. Letters should be headed "Press Owners' List."

Automobile War Service.—Owing to the fact that the War Authorities are constantly asking the Royal Automobile Club to extend the owner-driver scheme to fresh Government Departments, additional owner drivers are now wanted in London and throughout the provinces, and also in Glasgow and Edinburgh. The London service for the Headquarters of the London Command and the Ministry of Munitions has grown very considerably recently. This work is maintained chiefly by the aid of owner drivers who give up specified days of the week to the work, and additional assistance in this branch is now somewhat urgently required. The Club has been requested to organise services for the Navy and Army Canteen Board, the Aeronautical Inspection Department and the National Service Department. There is much interesting work to be done, entailing runs into the country from time to time, starting from London.

Glasgow Tramway Draw.—A new scheme of raising money to provide war comforts for soldiers, which was approved by the Town Council, came into operation on Monday. Mr. Dalrymple, the general manager, believes that there are many who are individually interested in particular funds, and that the chance of naming a contribution to that particular fund will appeal to their generosity. Those who desire to contribute will now purchase penny tickets from the conductors, and a list of forty war funds to which contributions have been allocated from previous collections will be exhibited in the cars. The only privilege that the contributor will have is the right to designate any one of these funds as the recipient of a percentage of the receipts. The drawing will take place each Monday, and the number of tickets drawn will depend on the number of tickets sold. The holder of the ticket bearing the first number drawn will have the disposal of the largest percentage of the receipts. The town clerk has advised that the new scheme is quite legal.

Overcrowded Trains.—A judgment concerning overcrowding in railway carriages was delivered on August 3 by the Judicial Committee of the Privy Council. The Appellate Court of Ontario upheld a decision against the Toronto Railway Company for committing a breach of an alleged legal duty by permitting overcrowding in their cars "whereby the property and comfort of the public as passengers were endangered." At the first hearing a jury found the company guilty of a criminal offence, but the Appellate Court entered a demurrer, though they found that an offence had been committed. The railway company appealed to the Judicial Committee of the Privy Council. Their lordships now held that the overcrowding was not a matter that affected the public as such, but only those members of the public who had obtained from the appellants licences to enter the cars, and, this being so, the Appellate Court of Ontario ought to have come to this conclusion and should have directed an acquittal. Their lordships, therefore, would advise his Majesty that the appeal of the company should be allowed.

The Channel Tunnel.—Mr. A. Fell, chairman of the House of Commons Channel Tunnel Committee, will ask Mr. Bonar Law next Tuesday whether the Government are in favour of the construction of the Channel tunnel, provided that no work is to be done or money raised during the continuance of the war, except with the consent of the Government, and whether on these conditions the Government will support a Bill to give the necessary powers to link up the South-Eastern and Chatham Railways of England with the Chemin de Fer du Nord of France. Mr. Bonar Law has been assured that the conditions indicated in the question are definitely accepted by the promoters of the undertaking. *The Times* states that an American group of capitalists recently made proposals to build the tunnel and submarine railway from England to France, and to provide the whole of the money needed to complete it. The have been informed that, if approved, the work will be carried out by England and France. Should the reply to Mr. Fell's question be favourable, the Bill for the construction of the British section of the scheme will be deposited in November for the consideration of Parliament next Session.

Belfast Tramways Position.—Referring at a recent Council meeting to the financial position, Alderman Tyrrell said that it should give pause to members of the Corporation who were quick to add to the burden of the undertaking. The readiness of the Corporation to give to the public too good value for their money was responsible for the fact that the current financial year began with a debit on the tramway revenue of £7,000. Hence arose the necessity for the recent revision and increase in the scale of fares. So far that revision had justified itself in an approximate increase of £7,000 in the revenue. In the meantime the Corporation has added a large amount to the expenditure by the last increase in wages granted to the tramway employees. But for these additional charges, Alderman Tyrrell believed that the undertaking would have come out on the right side of the accounts this year. There was, however, no margin in the estimates and they would be fortunate if they could go through the year without having to make a further readjustment of fares. The time had come to call a halt in the tramway expenditure, or on the other hand to ask Parliament to release them from the obligations of the Aberdeen clause.

Shortage of Men at Coventry.—Before the Appeals Tribunal the Tramway Committee appealed for five men whom they considered essential if the present tramway service was to be maintained. Mr. C. V. Pugh, chairman of the Tramways Committee, said that the undertaking was of vital importance to the city, and stated that workers could not go to and from their work without the tramways. They were satisfied that if more men were taken it would involve a reduction of services. They were now carrying each month a million and a quarter passengers, as against 700,000 before the war. Every effort had been made to substitute all available men, but the supply was small and difficult to tap. They had tried women drivers, but the department could not claim that they had been a success. Mr. T. R. Whitehead, the tramways manager, stated that the commencing wage of women was 8½*d.* an hour, with an increase to 9½*d.* after a certain period of service. The women, added Mr. Whitehead, had worked very strenuously, but they felt the work was more than they could manage in inclement weather and the winter months. The increase in passengers amounted to 80 per cent. as compared with pre-war figures. Prior to the war they had 62 drivers, but now, in spite of the increase in passengers, they had only 44 regular drivers, including substitutes, 5 women and 10 civilians who give a little help in the early morning and on Saturdays; the total was 59. It was only because the men worked long hours that they were able to maintain the services. The Appeal Tribunal, however, refused to vary the judgment of the local tribunal.

PERSONAL.

Mr. A. B. Slater, manager of Burton-on-Trent Corporation tramways, has been granted an increase of £25 in salary.

Mr. James Duncan has been recommended by the Tramways Committee of the Leyton Council for the appointment of traffic assistant, previously held by Mr. J. T. Fayle.

Mr. Frank Pick, commercial manager of the London Electric Railways, has been appointed by the Controller of Coal Mines as his assistant to deal with matters connected with the coal distribution scheme.

Captain Lionel A. Foers, M.C., of the Yorks and Lancashire Regiment, is reported wounded. Prior to enlistment he was acting as electrical apprentice to Mr. P. Priestly, then manager of the Mexborough and Swinton tramways.

Mr. R. S. Dunnell, secretary and solicitor to the North Eastern Railway has, with the approval of the directors of the North Eastern Railway, accepted the appointment of temporary and additional Assistant Secretary of the Admiralty.

Mr. Stanley Hirst has been elected general secretary of the Amalgamated Association of Tramway and Vehicle Workers. He has held the position of assistant secretary for about six years, and for the past six or eight months, on account of the ill-health of his predecessor, he has carried out the duties of the position.

Mr. Charles Furness, borough electrical engineer and tramways manager of Blackpool, has been asked by the Coal Mines Department of the Board of Trade to render assistance in visiting certain local authorities in Cumberland and North Lancashire, with the object of discussing fuel economies and submitting reports to the Board. The Tramways and Electricity Committee has considered the matter, and has advised Mr. Furness to act as he thinks best.

Company Sergeant-Major Fenton, previous to the war a conductor in the service of the South Lancashire Tramways Company, has been granted a commission as second lieutenant in the 3rd King's Liverpool Regiment. Conductor Fenton who had been discharged from the Army on a pension after a period of 21 years 150 days with the colours, again enlisted on the outbreak of war. He has since seen service in the Dardanelles campaign and was subsequently transferred to Kantara, Egypt, and then to France.

Mr. Frank Buckley, general manager of Wigan Corporation tramways, as mentioned in a recent issue, has been granted an increase of £100 in his salary. In submitting the recommendation to the Town Council, the chairman, Alderman R. T. Fletcher, chairman of the Tramway Committee, and the vice-chairman, Councillor J. Walkden, spoke in terms of the highest praise of Mr. Buckley's services and his success as manager of the undertaking. The Committee had confidence in their manager and had unanimously approved the increase.

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Bristol Tramways Employe's Medal.—Mr. Chas. Challenger, Bristol Tramways manager, sends us the following:—

Private C. F. Tuplin, of the A S.C., M.T., was awarded the Military Medal under the following conditions: He was in charge of a lorry delivering rations to batteries on the night of July 12, at Ypres. He and two men with him were heavily gassed, and the lorry riddled with shrapnel, after having delivered rations to two batteries. Although in this condition, he continued the delivery. Returning, still under heavy shell fire, he stopped at the Water Tower, Ypres, and picked up six men, wounded and gassed, bringing them to the casualty clearing station. On arrival at the Park, Private Tuplin and the other two men had to be taken to the hospital. Private Tuplin in civil life was a clerk for many years at Leek Lane carriage-building works of the Bristol Tramways and Carriage Co., and joined the A.S C. in the early stages of the war.

Captain James G. Cunliffe, of the Manchester Regiment, died of wounds on August 1. Three weeks ago he was awarded the Military Cross for bravery. Captain Cunliffe took the degree of M.Sc. (Tech.) at the Manchester School of Technology, and entered the service of the Manchester Corporation tramways, becoming assistant electrical engineer. He subsequently occupied a similar position at Birmingham. Captain Cunliffe was joint author with his brother, Mr. R. G. Cunliffe, of various papers read before the Tramways and other associations.

CONTRACTS AND ORDERS.

The British Thomson-Houston Company, Ltd., are to supply switch-gear for the power station extension of Rotherham Corporation, at £10,945.

Rotherham Town Council have accepted the tender of Babcock and Wilcox, Ltd., at £150,500, for six boilers required for the extension of the new power station.

The British Westinghouse Electric and Manufacturing Company, Ltd., are the successful tenderers for a 3,000 kw. turbo-generator for Stoke-on-Trent Corporation. The amount of the tender is £18,805.

FINANCIAL REPORTS AND MEETINGS.

Montreal Tramways Company have announced a further dividend of 2½ per cent., making up the usual distribution of 10 per cent. for the year ended June 30.

Oldham, Ashton and Hyde Electric Tramway Company.—The directors announce an interim dividend at the rate of 5 per cent. per annum (6*d.* per share) on the ordinary shares for the past half year.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended August 9 (which included bank holiday) amounted to £61,545, an increase of £9,466 as compared with the corresponding period last year. The route mileage was 141.67, the same as a year ago. From April 1 (the commencement of the financial year) to August 9 (eighteen and a half weeks) the total receipts were £1,030,016, an increase of £127,048 on the corresponding period of 1916.

Wolverhampton Corporation Tramways.—Sir Charles Mander presented the Tramways Committee's annual report at a meeting of the Corporation on August 1. The cars, he said, carried 1,700,000 more passengers than in 1916, and 10,000,000 more than in 1904. They took £6,705 more in receipts, but ran 33,000 miles less than in 1914, which was a record. 2.137*d.* more per car mile had been earned, showing that the cars were overcrowded. They ought to have more cars, but could neither get the cars nor the men to drive them. The committee had given the equivalent of a 4*d.* rate to the town. The accounts show a gross profit of £27,538, inclusive of £1,365 from the motor chars-a-bancs. After meeting the statutory charges the following appropriations were made:—Additions and improvements, £234; Maintenance and Repairs suspense account, £8,183; In aid of borough rate 1917-18, £6,580; Total £14,997. The sum of £56,645 now stands to the credit of the reserve and renewals fund. The impossibility of obtaining the necessary labour and material to do maintenance and repair work has made it imperative to suspend a large amount of ordinary work. The permanent way in particular needs a great deal of attention, also the electricity mains and telephone cables, and the committee consider it essential to set aside £8,183, which, together with £2,477 brought forward, amounts to £10,660 to meet the cost of this suspended work.

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Aberdeen Corporation Tramways.—In his report for the year ended May 31, 1917, Mr. R. S. Pilcher, the general manager, presents very satisfactory results. The total revenue for the year amounted to £100,073, an increase of £5,745, the highest figure yet obtained. Much difficulty has been experienced in coping with the traffic, and at times the whole of the cars have been in service. More cars are required, but there is little hope that these can be obtained until hostilities are over. The working expenses amounted to £64,026, an increase of £5,828, due to the rise in wages and the increased cost of materials. The profit, after payment of interest, sinking fund, and allowances for depreciation and renewals, amounted to £8,763, a decrease of £933 compared with last year. Of this amount the Corporation have carried £5,842 to the reserve account, and contributed £2,921 to the city funds. In spite of the higher cost of operation, the Corporation have not found it necessary to increase the fares. Owing to the scarcity of men, 137 women have been employed—5 as drivers, 118 as conductors, 13 as clerks, and one as an inspector. The total number of employees who have joined the Forces is 177, or 69.35 per cent. of the total male staff. The allowances paid to dependants during the year amount to £4,029. The car mileage was 2,033,793, an increase of 65,178 miles; and the number of passengers carried was 28,623,659, an increase of 2 029,929. The energy consumption per car mile amounted to 1.251 units, and the cost per unit was .839*d.*, or 1.050*d.* per car mile. The total revenue per car mile was 11.81*d.*, and the working expenses 7.55*d.*, or 63.98 per cent. of the income.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended July 28 give total receipts of £209,492, or £16,951 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £97 15s. 1*d.* per mile of single track, and last year at the rate of £89 16s. 11*d.*, thus showing an increase for the week of £7 18s. 2*d* per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914.	Cash, Aug. 9, orprevious	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt....	—	67	78½	78½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	58/1½	56/3
4%	4%	Do. 4% Deb. ...	100	91	70	69½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	73½
5%	5%	Do. 5% Deb. ...	100	96	67	67
1/-	7d.	Auckland Elec. Trams. Ord....	1	1 5/32	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	89½	89½
7%	7%	Barcelona Trac. 7% 50 yr. Pr. Lien	100	—	101½	101½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref....	10	11⅛	9½	10
4½%	4½%	Do. 4½% Deb.	100	96	77⅛	77⅛
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord.	$100	66	49	49⅛
$1¼	$1¼	Do. 6% Cum. Pref. ...	$100	97	89½	90½
4/-	4/-	Brisbane Elec. Trams. Ord....	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref.	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	101½	90½	91⅛
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	28	28
6%	5%	Do. Pref. Ord.	100	106	29	29½
5%	5%	Do. 5% Cum. Pref. ...	100	103	50½	50½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb ...	100	96½	53	53
£3*	£3*	Brit. Elec. Trac. Ord. ...	100	—	28	29½
6%	6%	Do. 6% Cum. Part. Pref....	100	—	73½	73½
8%	8%	Do. 5% Deb.	100	92	77	76½
4½%	4½%	Do. 4½% 2nd Deb.... ...	100	77½	66½	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ...	5	7½	6 11/16	6 9/16
1/3	1/3	City of B.A. Trams.	5	5½	81/10½	81/10½
5/-	4/-	Dublin United Trams. Ord. ...	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10½	10½
5%	5%	Hong Kong Trams. 5% Mt. Debs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	19/9	19/9
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord. ...	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams. Co. ...	10	10½	9½	9½
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1¼d.	Lond. & Sub. Traction Ord....	1	15/32	1/1½	1/-
6d.	6d.	Do. 5% Pref.	1	9/16	6/1½	6/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	63	61½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	81	78½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	33½	33½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 7/16	85/-	85/-
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light...	$100	102	63	62½
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$1½	$1½	Mexico Trams. Common ...	$100	70	25	25
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	35½	35½
6%	6%	Do. 6% Mt. Bds.	100	76	30½	29½
4½%	4½%	Montreal St. 4½% Stg. Dbs (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ...	100	99	92	92
1/22*	2/-	National Steam Car	1	1 3/32	19/9	19/9
9¾d.*	9¾d.*	New General Traction ...	1	⅜	7/3	7/3
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	8½	13/3½	13/3½
5/-*	6/-*	Para Elec. Rlys. Ord.	5	4½	80/-	80/-
—	—	Pernambuco Try. & Pr. Co. Ord.	—	1	5/9	5/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Trac. 5% Pref.	1	1 3/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ...	1	7/32	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. ... 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	86½	86
5%	5%	1st Mt. 5% 50 yr.	100	89½	77½	77½
5%	5%	Sao Paulo Deb. 5% 1st Mt....	$500	99	89	89
5%	5%	Do. 5% Perp. Deb. ...	100	99½	76	76
3d.	3d.	Singapore Elec. Trams. ...	5/-	¼	4/9	5/-
5%	5%	S. Elec. Trams. of B.A. 5% Mt.	—	100½	95½	94
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93½	93½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	67	67
—	—	Yorks. (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ...	5	⅛	86/3	86/3
—	—	Metropolitan Dist. Ord. ...	100	21½	15½	15½
—	—	Undgd. Elec. Rys. of London...	10	21½	31/3	31/3
		Do. "A"	1/-	¾	5/6	5/6
4½%	4½%	Do. 4½% Bds. of 1933 Rd....	—	99	101½	100½
6%	6%	Do. 6% 1st Cum. In. Db....	100	114	101	101
6%	4%	Do. 6% In. Bonds Rd. ...	—	88½	82	81½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915-16	Latest Return. 1916-17	Aggregate. Wks.	Aggregate. 1916-17	Increase or Dec.
Anglo-Argentine ...	Aug. 5	£49,487	£52,565	31	£1,588,026	+ £10,148
Auckland ... (29 days)	June 30	21,705	23,593	52	282,694	+ 7,931
Ballarat and Bendigo ...	May 20	3,854	2,991	8	7,602	+ 21
Brazilian Traction Mlrs.	June	7,178,000	7,642,000	26	44,646,000	+3,467,000
Brisbane	July	32,880	32,720	30	226,315	— 915
British Columbia $	June	400,814	373,029	52	5,325,756	+ 262,642
Buenos Aires Lacroze ...	July	38,439	38,063	4	38,063	— 376
Burmah Tram. & Light Rs	June	24,027	25,463	48	282,879	+ 29,134
Calcutta ... Rs.	Aug. 4	72.167	69,200	31	2,097,710	+ 17,215
Cape Town	May	...	15,867	21	84,829	...
Carthagena & Herrerias	July	2,371	5,763	30	29,935	+ 11,195
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	...	...	...
East India	July	2,220	1,183	52	21,509	— 3,861
Hong Kong ... $	June 16	16,624	14,607	24	316,876	— 10,151
Kalgoorlie	Apr.	2,553	2,705	17	10,101	+ 585
La Plata	July	3,910	3,875	30	29,019	— 816
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon ... ... Escu.	May	...	233,765	...	...	...
Madras ... (2 weeks) Rs.	July 15	34,007	36,083	28	444,499	+ 40,150
Manila ... ... $	May	53,900	61,500	...	...	...
Manaos ... — ... Rs.	Apr.	...	160,545	...	...	...
Melbourne	Mar.	63,000	64,506	13	186,321	— 9,179
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	Aug. 5	3,125	4,003	30	114,940	+ 22,707
Peruvian ... $	July	835,430	975,000	4	975,000	+ 139,570
Port Elizabeth ...	May	...	3,494	21	19,877	...
Rangoon	July	4,357	4,783	30	34,403	+ 1,465
Shanghai ... $	Apr. 25	25,305	12,610	...	...	...
Singapore ... $	June 9	13,189	13,527	23	301,525	+ 17,199
Toronto ... ... $	June	884,491	984,529	26	5,873,584	+ 538.385
Winnipeg	June	254.686	254.226	26	1,673.370	— 28.104

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1916	Latest Return. 1917	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917.	Aggregate. Incr. or Dec.
Aberdare U.D.C. ...	July 31	420	445	+ 25	17	£7,489	+ £747
Aberdeen Corporation	Aug. 1	2,074	2,237	+ 163	9	20,204	+ 2,936
Accrington Corp. ...	*	...	...	...	...	...	...
Ayr Corporation ...	,, 4	683	688	+ 5	12	7,083	+ 1,332
Belfast City	,, 3	6,036	6,361	+ 325	18	110,497	+ 9,119
Birkenhead Corp. ...	,, 5	1,663	1,935	+ 272	18½	32,483	+ 4,489
Birmingham Corp. ...	July 28	17,152	18,840	+1,688	17	302,373	+ 20,865
Do. Motor Omnibuses	,, 28	1,173	1,069	— 104	17	15,640	+ 887
Blackburn Corp. ...	Aug. 1	1,347	1,738	+ 391	18⅞	27,882	+ 3,886
Blackpool & Fleetwood	July 28	1,822	1,692	— 130	29	19,361	— 226
Blackpool Corp. ...	*	...	...	...	...	...	...
Bolton Corporation ...	,, 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corp. ...	Aug. 8	3,303	3,766	+ 463	18½	45,277	+ 1,509
Bradford Corporation ..	July 28	7,679	8,256	+ 577	17	129,978	+ 12,322
Brighton Corporation...	Aug. 5	1,817	1,866	+ 49	18½	26,049	+ 3,347
Bristol	,, 3	5,603	5,955	+ 352	30	161,101	+ 12,767
British Elec. Federation	*	...	...	...	...	...	...
Burnley Corporation ...	,, 4	1,797	1,930	+ 133	...	...	...
Burton-on-Trent Corp.	,, 5	301	342	+ 41	18	5,320	+ 443
Bury Corporation ...	,, 5	1,561	1,720	+ 159	18½	30,453	+ 3,367
Cardiff Corporation ...	*	...	...	...	...	...	...
Chatham & District ...	July 26	1,396	1,547	+ 151	30	37,472	+ 2,525
Chesterfield Corp. ...	*	...	...	...	...	...	...
Colne Corporation ...	*	...	...	...	...	...	...
Cork Electric	,, 26	619	680	+ 61	30	15,744	+ 997
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation ...	Aug. 4	1,281	1,260	— 21	18	21,217	+ 448
Dover Corporation ...	*	...	...	...	...	...	...
Dublin & Lucan ...	June 15	179	198	+ 19	24	3,404	+ 396
Dublin United... ...	July 27	7,629	7,723	+ 94	30	194,584	+ 22,120
Dundee City	Aug. 1	1,523	1,592	+ 69	11⅜	17,495	+ 1,833
East Ham Corporation	,, 4	1,476	1,405	— 71	18	25,723	+ 1,651
Exeter Corporation ...	,, 3	499	469	— 30	18	7,173	+ 39
Glasgow Corporation ...	,, 4	23,931	26,029	+2,098	9⅜	244,756	+ 28,816
Glasgow Subway ...	*	...	...	...	...	...	...
Glossop (U.Elec Supp.)	July 28	161	173	+ 12	30	4,301	+ 256
Halifax Corporation ...	,, 31	2,551	2,579	+ 28	17⅜	43,445	+ 2,969
Do. Motor Omnibuses	,, 31	60	53	— 7	17⅜	781	— 69
Hastings & District ...	Aug. 5	1,623	1,600	— 23	31	34,484	+ 5,618
Huddersfield Corp. ...	,, 4	3,247	3,269	+ 22	18	58,798	+ 4,781
Hull Corporation ...	,, 4	3,202	3,517	+ 314	18	60,323	+ 3,352
Ilford U.D.C.	,, 4	787	791	+ 4	18	13,739	+ 1,073
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	,, 4	621	798	+ 177	18	11,847	+ 1,872
Isle of Thanet... ...	,, 4	791	347	— 444	44	12,589	— 1,054
Kilmarnock Corp. ...	,, 4	192	184	— 8	11½	2,260	+ 176
Lanarkshire	July 26	2,675	3,096	+ 421	30	79,915	+ 12,795
Lancashire United ...	Aug. 1	2,061	2,624	+ 563	31	67,520	+ 13,427
Leeds City	,, 4	10,625	10,719	+ 94	18	197,943	+ 20,414
Leicester Corporation...	*	...	...	...	...	...	...
Leith Corporation ...	,, 4	992	1,099	+ 107	11½	12,832	+ 2,411
Leyton U.D.C. ...	,, 2	1,999	1,917	— 82	18	34,352	+ 3,976
Liverpool Corporation	,, 4	15,726	16,564	+ 838	30⅜	468,080	+ 39,583
Llandudno & Colwyn Bay	July 27	580	561	— 19	34½	9,239	— 699
London County Council	Aug. 8	52,079	61,545	+ 9,466	18½	1,030,016	+ 127,048
London Genl. Omnibus...	*	...	...	...	...	...	...
London United... ...	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	,, 2	256	239	— 17	18	4,278	+ 337
Manchester Corp. ...	,, 4	19,635	20,082	+ 447	18	366,762	+ 23,820
Met. Elec. Trays. ...	*	...	...	...	...	...	...
National Steam Car ...	*	...	...	...	...	...	...
Nelson Corporation ...	July 28	257	289	+ 32	17	3,990	+ 246
N'castle-on-Tyne Corp.	Aug. 4	7,322	7,970	+ 648	18	138,410	+ 19,870
Newport (Mon.) Corp....	*	...	...	...	...	...	...
New St. Helens & Dist.	,, 1	1,260	1,569	+ 309	5	7,642	+ 2,284
Northampton Corp. ...	,, 3	785	857	+ 72	18	14,393	+ 1,735
Nottingham Corp. ...	,, 2	4,187	4,420	+ 233	18	76,083	+ 6,635
Oldham Corporation ...	,, 5	2,726	2,972	+ 246	19	53,943	+ 5,106
Portsmouth Corp. ...	,, 4	3,644	3,041	— 603	...	...	...
Preston Corporation ...	,, 1	1,120	1,190	+ 70	17⅝	20,738	+ 1,373
Provincial	,, 4	3,092	2,679	— 413	44	97,503	+ 176
Reading Corporation ...	,, 2	978	1,058	+ 80	17⅝	17,811	+ 2,902
Rhondda Tramways ...	July 26	1,424	1,608	+ 184	30	43,037	+ 6,129
Rochdale Corporation...	Aug. 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corp. ...	,, 8	1,748	1,946	+ 198	18⅛	32,718	+ 4,966
Salford Corporation ...	,, 6	6,089	8,748	+ 2,659	18⅝	121,756	+ 19,216
Sheffield Corporation ...	,, 5	10,782	11,717	+ 935	19	223,144	+ 24,258
Southampton Corp. ...	,, 1	1,935	1,975	+ 40	17⅛	33,971	+ 4,987
Southend-on-Sea Corp.	,, 1	1,430	1,153	— 277	18	16,939	+ 1,157
South Met. Trays. ...	*	...	...	...	...	...	...
South Shields Corp. ...	July 28	992	1,060	+ 68	17	15,982	+ 2,095
Sunderland Corp. ...	Aug. 5	1,939	1,893	— 46	18	32,336	+ 2,481
Sunderland District ...	,, 1	786	831	+ 45	40	27,417	+ 3,726
Swindon Corporation ...	July 4	193	271	+ 78	13⅜	3,574	+ 888
Torquay Tramways ...	,, 26	760	802	+ 42	30	16,726	+ 1,300
Tyneside Trys. & Tmrds.	,, 25	846	1,077	+ 231	4	3,585	+ 872
Wallasey Corporation ...	Aug. 4	1,760	1,926	+ 166	18½	28,579	+ 3,073
Walsall Corporation ...	,, 4	871	968	+ 97	17	16,894	+ 1,709
Walthamstow U.D. ...	,, 4	1,462	1,216	— 246	18	22,751	+ 2,335
Warrington Corp. ...	July 26	516	552	+ 36	17	8,726	+ 586
West Ham Corporation...	Aug. 8	3,571	3,701	+ 130	17⅞	65,791	+ 6,939
Wigan Corporation ...	,, 2	1,702	1,961	+ 259	18	34,337	+ 4,253
Yorkshire (W. Riding)...	,, 5	2,090	2,348	+ 258	3⅜	63,112	+ 9,898

* Issue of Traffic Returns suspended during the War.

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AND
MAINTENANCE
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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

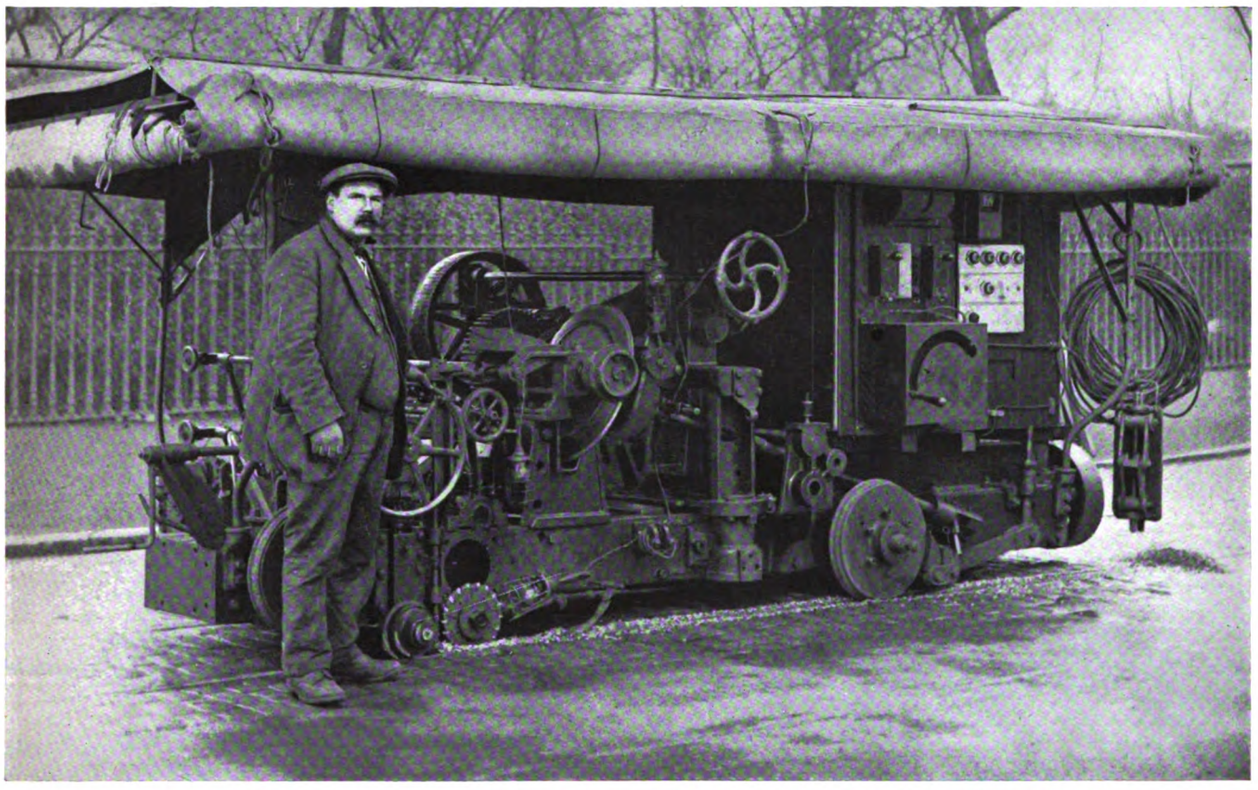
Founded 1892. LONDON, AUGUST 16, 1917. VOL. XLII.

AN ECONOMICAL MEANS OF RAIL RENEWAL.

LIFE OF RAILS EXTENDED BY REDRESSING THE HEAD.

It is well known that tramways throughout the country are suffering greatly from the inability of the owners, whether municipalities or companies, to maintain and reconstruct the tracks owing to the lack of rails and the shortage of labour. At the end of the war, owing to the great demand that will arise for the necessary materials, rails, cement, granite setts, etc., the prices will no doubt be exorbitant. In the interest of tramway owners, as well as of the public, it would be an immense advantage if some method could be adopted for the purpose of treating the existing rails in such a way as to prolong their life and consequently minimise the demand for steel and other materials. The facts with regard to the tramway situation have been brought to the knowledge of the Ministry of Munitions from time to time. As an indication that they realise the seriousness of the position it is satisfactory to record that they have recently granted an "A" priority certificate to the Woods-Gilbert (British) Rail Grinding and Milling Company, Limited, for the construction of five machines of their latest type; and we understand that one of these machines will be constructed immediately and the others as soon as the necessary materials can be obtained.

This system has been described in previous issues and an illustration of the last machine constructed by the company is appended. We are also able to give sections of rails in Bolton which have been remodelled by the machine. In these drawings the original section of the rail head is shown by the top line, the wear that took place in each case is indicated by the shaded portion, while the part of the groove which has been cut out by the machine to deepen the groove is shown in solid black. The rail section from the Cardiff tramways shows also a portion of the lip cut away.



Rail-Cutting Machine at Work Deepening Groove of Worn Rail.

It is perhaps not generally known to what extent rails can be remodelled by the system, but the sections reproduced on the following pages show that rails

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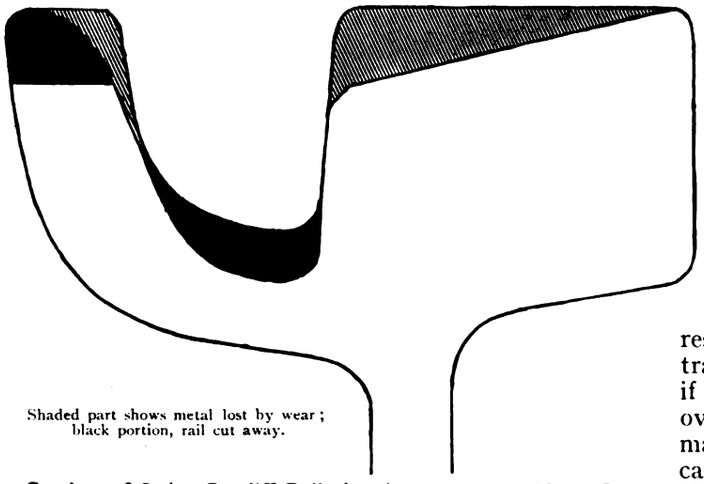
which have become so badly worn as to be useless can be given an additional life of five to eight years. The standard depth of flange on tramway systems is $\frac{18}{32}$ in., and the original depth of groove 1 or $1\frac{1}{8}$ in. Where the tread of the rail in which the groove is 1 in. in depth is worn away $\frac{14}{32}$ in., the flange of the wheel must ride on the groove, and from this time the depreciation of the rail is exceedingly rapid, while the lip of the rail is likely to fracture and break away, thus contravening the regulations of the Board of Trade. The thickness of metal below the groove in some of the rails is $\frac{24}{32}$ in., and with the remodelling machine it is possible to mill out about one-half of this depth, leaving the thickness of metal at the bottom of the groove about $\frac{12}{32}$ in., which is considered sufficient to carry the weight of any vehicular traffic, the guard of the rail being protected by the paving.

Estimates prepared for the reconstruction of the lines of an important undertaking that would normally be required between the years 1915 and 1917, assuming that a supply of rails could be obtained, show that a sum of £35,528 would be required. The estimate under pre-war conditions would have been £21,533. If, however, the whole of the lines were treated by the Woods-Gilbert process, that is, were regrooved and remodelled, the estimated cost would be £2,528, and the life of the rails would be prolonged about four years, by which time, it is reasonable to hope, the cost of rails and other necessary material will have reverted to something approaching pre-war prices. Dealing with the tracks to be reconstructed in the years 1918-19-20, inclusive, the estimated cost based on present prices would amount to £115,300, as against a pre-war estimate of £69,900. If the work were done by the rail cutting process, it is estimated that the cost would not exceed £8,177. The prolonging of the



Section of 6½-in. Cardiff Rail showing, in Black, Metal Cut Away by Rail Machine.

life of portions of the track of the undertaking referred to by the Woods-Gilbert process would have the effect of relieving the steel market to the extent of 3,000 tons of rails during that period. As the total length of tramways in the United Kingdom is about 5,329 miles, and assuming that the tracks have an average life of 15 years, the approximate quantity of rails required for the reconstruction would be about 52,935 tons per annum.

No reconstructions have, however, been carried out since the commencement of the war, with the result that a very large mileage will urgently require attention immediately after the war. Each additional year's delay brings other tracks to the time when reconstruction becomes imperative and consequently the demand for steel rails will be well in excess of the supplies in this country and large orders must be placed abroad. Postponement will not be possible at that time, for in view of the industrial demands which must be met after the war it is absolutely essential that tramway undertakings should immediately be put in a position to provide the utmost facilities for working people.

The following table shows the length of single track, the estimated length of track due for reconstruction up to 1921, and the approximate quantity of rails required by 14 tramway authorities in Lancashire.

Authority.	Total Length of Track (Single Line).	Estimated Length of Track due for Reconstruction up to 1921.	Approximate Quantity of Rails Required.
	M. Fur. Ch.	M. Fur. Ch.	Tons.
Ashton-under-Lyne ...	9 0 0	5 0 0	400
Birkenhead	24 0 0	12 0 0	2,000
Blackpool	21 5 1·10	15 0 0	3,074
Bolton	48 0 0	18 0 0	·,090
Bootle	8 0 0	8 0 0	1,300
Burnley	22 0 17	12 0 0	1,920
Darwen	0 6 6	0 6 6	150
Eccles	8 0 5·66	4 0 3	330
Manchester	180 0 0	22 0 0	3,500
Preston	17 1 6	7 0 0	800
Rochdale	28 6 0	6 0 0	1,000
Salford	56 0 0	31 0 0	5,000
Southport	27 0 0	27 0 0	4,455
Stalybridge	27 4 0	10 0 0	1,500
Total	478 0 15·76	177 6 9	28,519
Tramway systems of the country	5,329 0 0	1,984 0 0	317,874

As will be seen from the table, out of the total of 478 miles of track, 177 miles will have to be reconstructed up to 1921, for which 28,519 tons of rails will be required. For the whole of the 5,329 miles of tramway track in the country, it is estimated that 1,984 miles will require to be relaid up to 1921, and that to carry out this work 317,874 tons of rails will be required. In addition, of course, there will be the track fittings, including electrical bonding.

An immediate demand for at least 20,000 tons of rails is to be expected at the end of the war, and as we have seen, the cost will be almost prohibitive.

The railway companies will also be in the market for the supply of steel rails, etc., and this will tend to maintain prices for a long time after peace is restored. It will consequently be in the interests of tramway owners and the general industry of the country if the reconstruction of tramway systems can be spread over as long a period as possible. Indeed, in the case of many tramway authorities any addition to the present capitalisation of the undertakings would be disastrous; and it is the more essential that expedients that will avoid the expenditure of fresh capital soon after the war should be found.

The value of the Woods-Gilbert process in the present juncture is very clearly brought out in a report that Mr. E. L. Morgan, borough engineer and surveyor of Bolton, recently presented to the Permanent Way Sub-Committee of Bolton Tramways Committee. As a preliminary he points out that consequent on the war and the difficulties of obtaining material and labour, and on the request of the Treasury that as far as possible all work involving expenditure should be delayed, it had been decided that no track reconstruction work should be carried out in Bolton during 1915. Subsequently it became necessary that the reconstruction proposed for 1916 should also be postponed. Only some short pieces of track have been renewed. On April 4 last Mr. Morgan reported to

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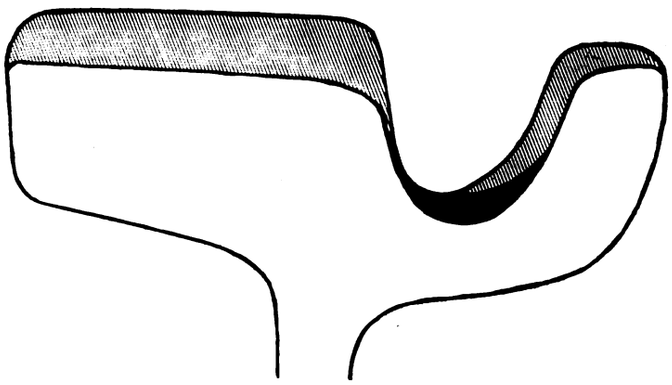
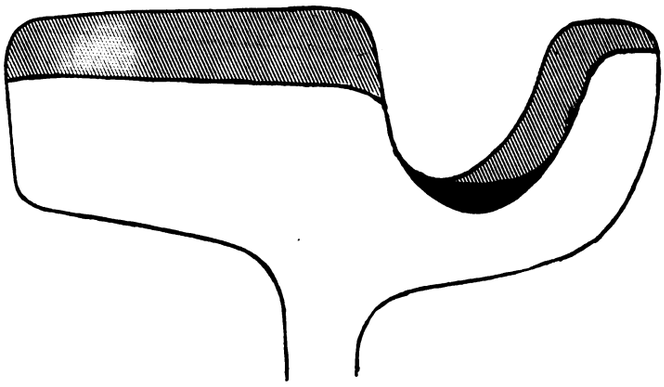
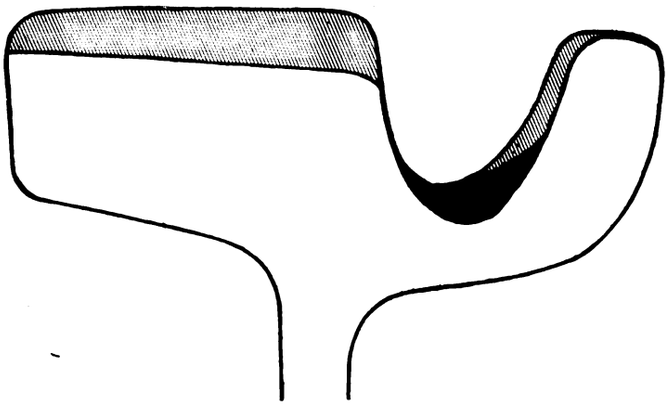


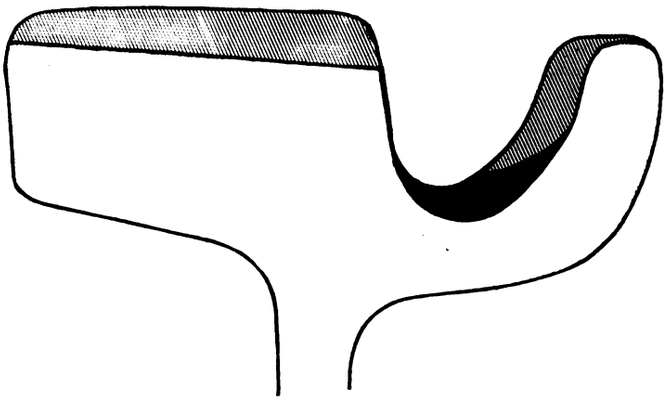
Outward Track, Derby Street (1900).



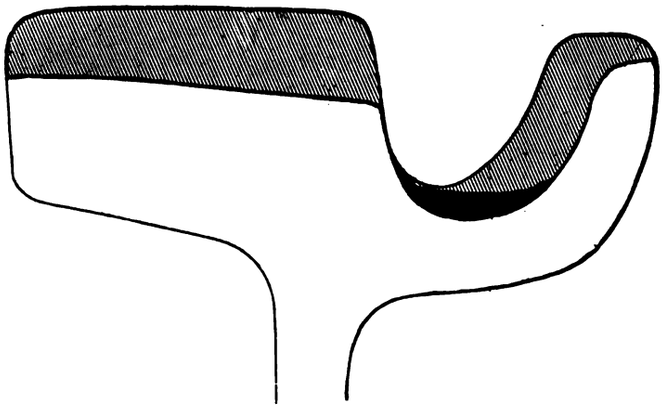
Inward Track, Derby Street (1903).



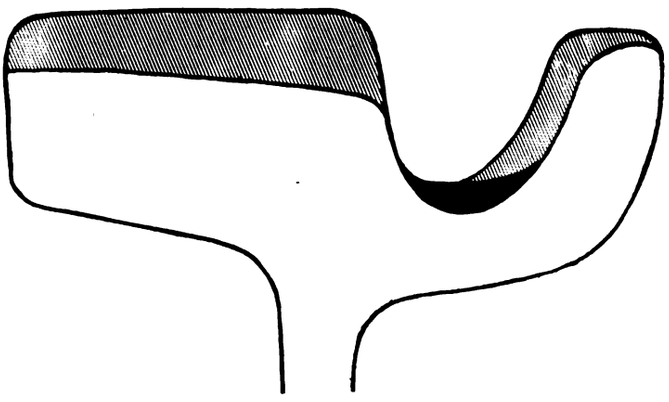
Inward Track, Wigan Road (1900).



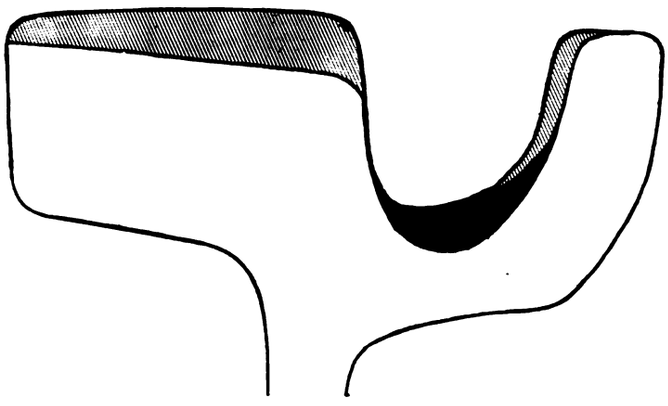
Outward Track, Wigan Road (1900).



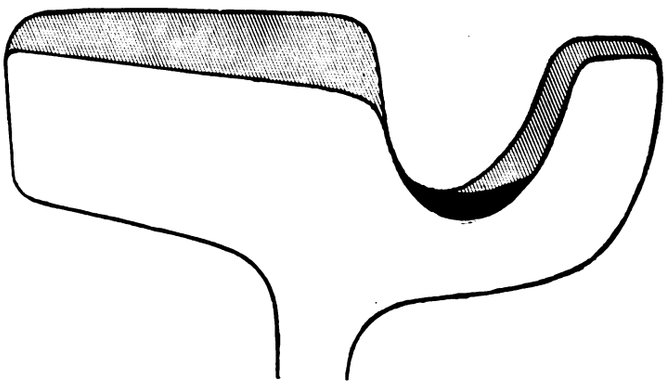
Inward Track, Higher Bridge Street (1901).



Inward Track, Halliwell Road (1901).



Inward Track, Chorley Old Road (1901).



Inward Track, Chorley New Road (1901).

SECTION OF BOLTON RAIL HEADS, SHOWING THE REMODELLING RENDERED NECESSARY BY WEAR.

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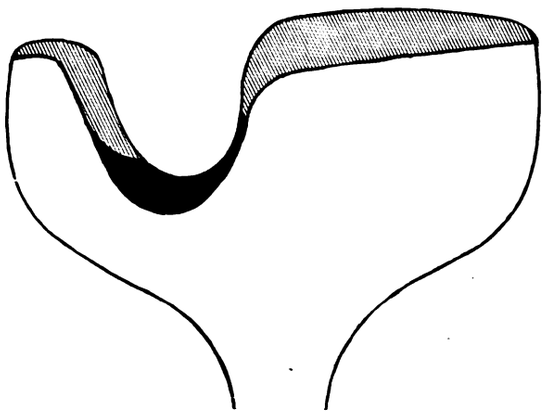
the committee on what had been done by the Woods-Gilbert process in some other towns, and the committee then visited Wigan and Ashton and saw what had been done there. They were satisfied that the process was worthy of consideration. At Wigan an increased life of track of about four years is anticipated, while at Ashton three years' use has already been obtained, and two or three years' more life is anticipated.

On April 10 an inspection was made of the Bolton tracks, and particulars were taken of the depths of grooves, corrugation, etc. From these data Mr. Morgan drew up a statement setting out the work which it was suggested should be undertaken at the present time. This statement showed a length of single rail to be re-grooved of 44,667 yards, a length of single rail from which corrugations had to be removed of 16,710 yards, and 341 joints to be dressed. Most of the rails originally had a groove 1 in. deep, while the present depth of groove varies from 18-32 in. to 20-32 in. Thus in places the grooves are not of sufficient depth to allow of the Bolton standard 18-32 in. wheel flanges. If the cars ride on the flanges on the bottom of the grooves this will cause material damage to the check of the rail, which will eventually fracture. There is increased wear and tear of rolling stock, and broken axles are apt to occur.

Mr. Morgan proceeds to point out the evil effects on the track of rail corrugation, and in regard to



Wigan Rail, Showing, in Black, Metal Cut Out to Deepen Groove.

hammered joints he says that in some instances the joints are supported by a short length of inverted rail. It is quite possible that the rigidity of the rail at these joints is responsible to some extent for the hammering and also for some part of the corrugation. It is a significant fact that where Thermit welding has been adopted there are no hammered joints, and the corrugation is less in extent. He is of opinion that when the whole track is Thermit-welded the corrugation will be less, the hammered joints fewer, and the cost of maintenance reduced.

The whole of the work of deepening the groove, taking out corrugation, and dressing up and planing of hammered joints is—Mr. Morgan continues—provided for by the Woods-Gilbert process. The company suggest that the depth of the groove should be increased from 6-32 in. to 8-32 in. This will allow of $\frac{3}{8}$ in. of metal between the bottom of the groove and the underside of the rail below the groove. The tramway authorities at Wigan and Ashton were of opinion that this was sufficient to carry the traffic without any danger of fracture of the check when the paving alongside was in a reasonable condition. To be on a perfectly safe basis, Mr. Morgan puts the estimated additional life on the Bolton system at three years, and this is undoubtedly an ultra-conservative estimate.

The price paid at Wigan for re-grooving the rails is 7d. per lineal foot; taking out corrugation, 6d. per lineal foot; and dressing of joints, 8s. 6d. each. To the latter amount 20s. per joint is added so as to allow for any work required in repacking or lifting the joints, making the total cost per joint 28s. 6d. The Wigan prices are based on the assumption that the work can be carried on for 72 hours per week. In regard to three-fourths of the work in Bolton the hours will not exceed 66 per week, and for the other fourth 36 per week. The Woods-Gilbert Company are prepared to undertake the work on the portion where they are able to work 66 hours at the same rate as Wigan, while for the other portion they would require an increase of 50 per cent.

The length of line to be treated, and the estimated cost, are as follow:—

100,546	lineal feet re-grooving at 7d.	...	...	£2,932	11 10
33,515	do. do. 10½d.	...	...	1,466	5 7
50,130	do. corrugation at 6d.	...	...	1,253	5 0
341	hammered joints at 28s. 6d.	...	...	485	18 6
	Total			£6,138	0 11

As the taking out of corrugation will reduce the cost of maintenance, Mr. Morgan suggests that the cost should be taken out of revenue, leaving a balance of £4,884 15s. 11d. This expenditure will equal £383 per mile. The saving on the depreciation fund by the extended life would in the three years amount to £552 per mile.

Passing from Mr. Morgan's report, it may be noted that it is with the object of enabling the Woods-Gilbert Company to assist the tramway undertakings that the Ministry of Munitions have given them authority to obtain additional machines. The work that has already been done in Bolton, Ashton, Wigan, and Cardiff has been found satisfactory by the engineers in charge of those undertakings, and there is no doubt that the success which has attended the application of the system will be repeated elsewhere.

From information supplied by Mr. A. T. Gooseman, borough engineer of Wigan, it appears that in Wigan about eight miles of rails were remodelled under his supervision. The grooves of the rails were deepened by a quarter of an inch, while corrugations were removed and the joints redressed. He estimates that the work will add at least four years' life to the track, which was worn out. If the rails had not been remodelled it would soon have become necessary to stop the service, as it would not have been safe for the cars to run on the tracks, and new rails could not be obtained.

In our issue of April 12, 1917, particulars were given of the work carried out on the Cardiff tramways with which the late Mr. W. Harpur, city engineer, expressed his complete satisfaction, believing that an additional life of at least five years has been obtained for the track.

The system was, we believe, first applied in this country on the Oldham, Ashton, and Hyde tramways, and Mr. R. B. Holt, permanent way engineer of the Leeds City Tramways, commenting on the work done there, in his book on "Tramway Track Construction and Maintenance," states that after witnessing the operation of the rail planing machine he was favourably impressed with the manner in which it performed the work of deepening the grooves and lowering the check. The work was rapidly executed and with great accuracy. So accurately balanced and adjusted was the machine that it cut the rail groove to within $\frac{1}{64}$th of an inch of the standard depth under all conditions of track.

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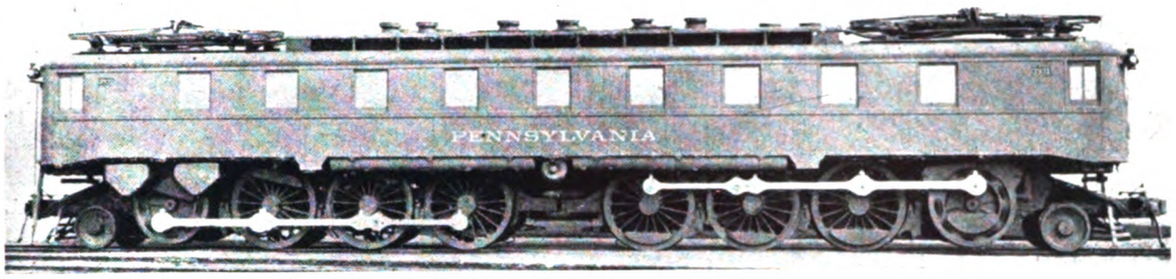
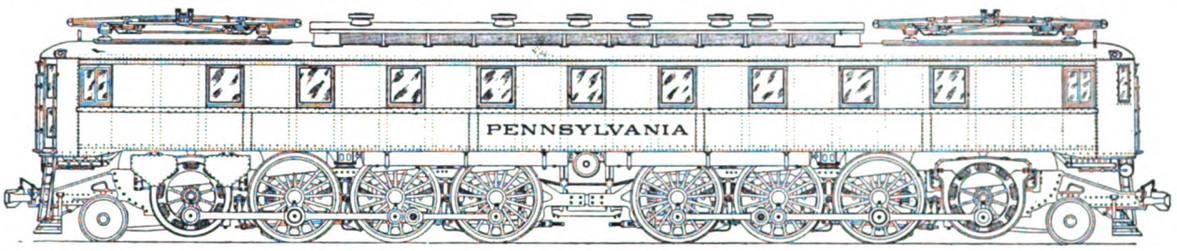
LATEST TYPE OF PENNSYLVANIA ELECTRIC LOCOMOTIVE.

Within the last few years a number of important railway companies in the United States, when adopting electric traction for certain of their lines, have shown boldness in going in for new types of electric machines to suit the particular conditions of the particular road.



Latest Type of Pennsylvania Railroad Electric Locomotive.

Among such companies is the Pennsylvania. It may be remembered that when this company extended its lines from Jersey City by means of tunnels under the Hudson River into the heart of New York City, a bold departure was made in electric locomotives. The motor was mounted well above the driving wheels and connected to them through a countershaft by connecting

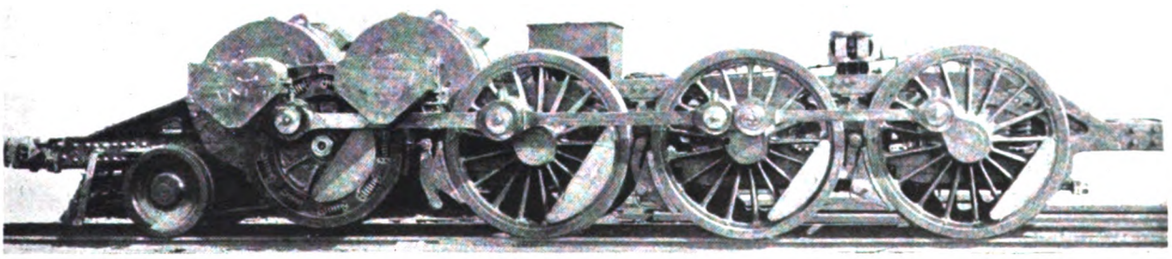


Side Elevation Showing Arrangement of Gears and Driving Wheels.

rods instead of gearing. This meant that the speed of the motor was the same as the speed of the driving wheels. Direct current was employed, and these locomotives appear to be doing well. In the new machine which is now being tested, particulars of which have appeared in the American railway engineering journals, the arrangements show considerable differences. This locomotive has to haul very heavy trains over steep gradients. Spur-wheel gearing is reverted to between the motors and a countershaft, from which connecting rods are employed. Three-phase current is used, and an unusual feature is that the locomotive is not in two units but in one, the cab being continuous from end to end.

This locomotive was designed for service in hauling the heavy freight traffic over the Allegheny Mountains between Altoona and Johnstown, Pa., a distance of about 37 miles, including the famous Horse Shoe Curve. The freight traffic over this division averages about 300,000 tons a day. The locomotive will be tested over the Philadelphia-Paoli division, which was electrified about two years ago, and then may be transferred to the Bluefield (West Virginia) division of the Norfolk and Western Railroad for further trial. The latter railway has conditions very similar in many respects to those of the Altoona division, that is, heavy freight traffic and steep gradients. This engine is similar electrically to Baldwin-Westinghouse electric engines used on the Norfolk and Western Railroad, deriving its energy from an 11,000-volt, single phase, 25-cycle system, and changing it by means of a phase converter to three-phase current. Pantagraph collection from an overhead contact wire is employed.

There are four motors, each with a rating of 1,200 H.P., giving the locomotive a rating of 4,800 H.P. Two motors are mounted on each truck frame, and geared to a countershaft from which the driving wheels are driven by connecting rods. The springs in the gears of these countershafts are so adjusted as to give the effect of a solid gear up to a tractive effort equivalent to 25 per cent. of the weight on the drivers, thus producing the effect of a solid gear under ordinary operating conditions. The locomotive is designed for a normal operating speed of 20·6 miles per hour, obtained with the motors in parallel. This speed is the maximum that



One of the Two Motor Driving Trucks, Showing Position of Motors and Spring Gear.

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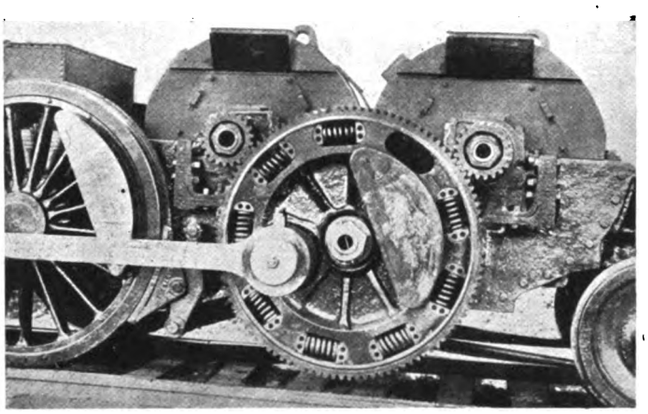
is considered safe for the heavy trains these locomotives will be required to negotiate on the grades of the Altoona division.

Two of these engines, one pushing and one pulling, will haul a 3,900-ton train at this speed up the 12-mile gradient of 2 per cent. from Altoona to Gallitzin, and a 6,300-ton train eastbound up the 1 per cent. grade from Johnstown to Gallitzin, a distance of 25 miles.

A lower speed of 10·5 miles per hour may be obtained by connecting the motors on the same truck in cascade, and this pair parallel with the pair on the other truck. This speed will only be used round the yards and for especially slow movements. Intermediate speeds can be obtained between zero and the maximum by means of a water rheostat control system, which permits a very close regulation of the tractive effort developed by the locomotive during acceleration. The tractive effort developed at the maximum speed is 87,200 lb.

The running gear of the locomotive is similar in general construction and appearance to that used on steam locomotives. There are two trucks each with two motors, the gear wheels being connected by side rods to the driving wheels, of which there are twelve.

The spring gear for each truck is of the three-point suspension type, one point being over the pony truck and the other two over each frame, consisting of equalisers over each box, elliptical springs between



Details of Spring Gear and Motors with Hollow Shafts.

journals, and helical springs outside of the first and third journals. The motor and countershaft gears are spiral, and as the gears on each end of the motor and countershaft are cut opposite, a herringbone effect is secured.

Brake shoes are provided for one side of each driver, the brake arrangement being of the usual steam locomotive type with two cylinders, each 16 in. in diameter, placed between the frames between the second and third axles. The train brake and locomotive brake can each be operated independently of the other. Above the frames, and between the first pair of drivers, is a sand-box with sand-pipes leading to the front of the first pair of drivers and to the rear of the third pair of drivers, and equipped with Leach double "E" sanders.

The gear wheels have inward projections forming the countershaft journals. The bearings are solid bronze forced into a circular opening in the frame casting. The centre plate is half way between the first and second axle, at an elevation of about the height of the top of the frames. Between the second and third axles an auxiliary spring support has been applied for the purpose of equalising the loads on the various drivers. The contact between the caps over these springs and the bottom surface of the cab must necessarily be a sliding contact.

Each motor truck includes a pony truck of the Pennsylvania Railroad type, with an elliptic spring on each side of the axle and supported on T-links. As the usual T-links alone will not provide sufficient lateral motion a rocker casting supported by the elliptic springs has been added. The combination T-links and rocker permit sufficient lateral motion for curves of 275-ft. radius.

The articulation between the motor trucks is of a construction similar to a pedestal attached to the cab centre sills. The lower ends of the pedestal legs are connected together with a tie-bar. This permits each truck to rotate round the centre of the centre plate without restriction. All bearing surface in the articulation are plated with manganese steel. The pulling and pushing strains between drawbars carry through the trucks and articulation in a direct plane 34½ in. above the rails, so that the cab is entirely relieved of these strains.

The principal characteristics of this locomotive are as follows :—

Railroad classification	FF1.
Overall length	76 ft. 6¼ in.
Total wheel base	63 ft. 11 in.
Driving wheel base	38 ft. 8 in.
Rigid wheel base	13 ft. 4 in.
Height from rail to locked position of pantagraph	15 ft. 6 in.
Height from rail to top of cab ...	14 ft. 8 in.
Width over cab body	10 ft.
Overall width	10 ft. 1 in.
Diameter of driving wheels ...	72 in.
Weight on drivers	198 tons.
Diameter of pony wheels	36 in.
Number of driving axles	6
Weight on each pony truck ...	21 tons.
Total weight of locomotive ...	240 tons.
Voltage of locomotive	11,000
Tractive effort	87,200 lb.
Speed	20·6 miles per hour
H.P. at 20·6 miles per hour . .	4,800
Load on 1 per cent. grade ...	3,350 tons.

INCREASING COST OF MATERIALS.

Mr. Henry Mozley, general manager of Burnley Corporation Tramways, in his report for the last financial year, remarks that the cost of materials has gone on increasing and still shows a tendency to rise. He gives the following percentage of increases in the cost of the various materials compared with the prices before the war :—

	Per cent.		Per cent.
Tires	235	Screws, iron	81
Axles	258	Gears	64
Bar iron	89	Pinions	130
Steel	143	Gear cases	46
Axle brasses	26	Armature bearing caps ...	125
Trolley wheels	26	Raw linseed oils	64
Armature wire	79	White lead	111
Commutators	26	Zinc white	119
Malleable iron castings ...	21	Spring wire	60
Controller segments	52	Brake blocks	20
Controller fingers	28	Cast iron	22
Lubricating oils, machinery ...	166	Deal floor boards	154
Lubricating oils, black ...	71	Pitch pine	92
Carbide	77	Oak life-guard strips	60
Glass	23	Ears	21
Bolts	126	Frogs	45
Brushes Kitool	54	Guard wire	191
Coke	57	Tickets, ordinary	125
Sand	36	Tickets, workmen's	57
Cotter pins	125	Copper bonds	100
Wire nails	394	Files	60
Screws, brass	105		

Lancashire and Yorkshire Railway Electrification.—The work of converting the Bury-Holcombe Brook line of the Lancashire and Yorkshire Railway has been commenced. The system of electric traction will be the same as that in use on the Manchester-Bury section, which was fully described in THE TRAMWAY AND RAILWAY WORLD of January 13, 1916.

Railway Electrification after the War.—In his address at the annual meeting of the General Electric Company on July 17 the chairman (Mr. H. Hirst) remarked that many industries on which the country relied would have to modernise their methods and rejuvenate themselves. Electric power, heat, and light were primary essentials in such a programme; the depletion of rolling stock in the country would have to be made good, and many of the railway companies would have to prepare for electrification on a large scale.

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THE FIXING OF TRAMWAY FARES.

By A Special Correspondent.

The previous note published in the issue dated March 15 of The Tramway and Railway World, under the title "Halfpenny Fares on Tramways," was not in any sense a forecasting of a complete policy of fares, but rather an attempt to show first, that on the basis of ascertained facts as to the cost and efficiency of operation there was a want of relation between the rates of fare charged and the expenses incurred in operation, and, second, that the remedy was not merely in the suspension of halfpenny fares as such. In view of certain criticisms which this note has provoked, it is necessary to amplify it in two particulars, still using the situation on the L.C.C. tramways for illustration.

The working expenses of a tramway system may be analysed into two groups—those which are fixed in relation to the car mileage worked, and those which vary with the car mileage. Taking the detailed expenses of the L.C.C. tramways for the year 1915-16, there are six main divisions, viz., power, traffic, advertisement, repairs, general, and special. Of these power, traffic, and repairs would seem to have direct relation to the work performed or the car mileage run, and advertisement, general, and special might be taken to be fixed irrespective of the work performed. This is a rather rough analysis, as there are portions of the expenses under each division about which there might be argument on their correct allocation, and it may be admitted at once that the balance of advantage is with the fixed expenses. If, however, 10 per cent. of the variable expenses be transferred to the fixed, as representing the initial establishment, and ignoring the possible existence of ample and expensive operating margins, the result will be approximately accurate, and shows as follows :—

	£	Proportion.	Pence per Car-mile.
Fixed expenses ...	493,895	30	2·53
Variable expenses	1,199,765	70	5·91
	1,693,660	100	8·44

As the fixed expenses have no immediate relationship to the service rendered, it must follow that every passenger must pay an equal proportion of them. Otherwise, as the variable expenses have a direct relationship to the service rendered, that is the mileage covered, every passenger must pay a rateable proportion of them in accordance with the length of journey taken.

Turning from working expenses to reserves for renewals, the cost of renewals would clearly follow the volume of service rendered and would be proportionate to work done.

With net earnings the correct allocation is much more difficult. It follows no simple rule. It is at this point that the maxim which commends charging what the traffic will bear comes into play, with of course a reasonable limitation of net earnings. Clearly, any traffic which would yield any margin of profit is acceptable so long as it does not hinder the carrying of other traffic which would yield a higher margin. If the net earnings were to be distributed equally over all passengers carried, halfpenny fares become impossible, for the burden to be met by the halfpenny fare is greater than the halfpenny. The question then resolves itself into whether halfpenny passengers can be made to pay a penny, and if not, whether the cars are so overcrowded at most points on a route that the abolition of halfpenny fares is warranted by the existence of more remunerative traffic. (It was shown in the preceding article that under certain conditions halfpenny fares were more remunerative than penny fares where the penny distance is prolonged.) This same line of argument will disqualify all cheap or reduced fares, such as those for workmen and excursions. It may therefore be said to disqualify itself.

The correct solution involves a consideration of the policy underlying the development and operation of the transport system. If the policy is purely grounded in financial considerations, then the halfpenny fare may not be justified, but if the policy is grounded in an attempt to meet the public convenience and requirement in the largest measure, then the halfpenny fare is sound. And so for workmen and excursions. The correct solution also involves a consideration of the response which the public will make to a finely graduated scheme of fares as against a more abrupt one. This consideration comes in to reinforce that derived from the public convenience and requirement, for the better adjusted the fares, the greater the volume of traffic, and in this is the justification of the halfpenny fare in normal times and on normal sections of route. Still there can be no sure rule for the distribution of the net earnings, but reliance must be placed upon the judgment of the management. Here is the place for competent management and advice.

As the largest portion of the L.C.C. tramways traffic is carried at penny fares, and as the average receipt from all traffic is just a penny, for the purpose of the original argument as to the correct penny distance it may be convenient with this warning to treat the net earnings as falling entirely into fixed charges to be levied equally on all passengers. This may be the most unfavourable hypothesis. The final result is shown in the following table :—

Fixed Charges to be levied per Passenger.

	Pence per Car-mile.
Fixed expenses	2·53
Net earnings	3·29
Deficiency in net earnings	·41
Total	6·23

Variable Charges to be levied per Passenger-mile.

Variable expenses	5·91
Renewals	1·00
Total	6·91
Grand total	13·14

(Something of this sort would seem to be the purport of the analysis made by the Ilford Tramways manager.)

When it is a matter of applying passengers and passenger-miles to the figures, an element of guesswork must come in. The average length of the journey taken is not known. In calculating the average load of 23 passengers per mile, it was assumed that every passenger took a full ride. It therefore represents, as previously stated, "the highest possible reckoning." It is most likely, as a critic points out, that the average load did not exceed 16 or 17, but it must be clearly recognised that the lower the figure accepted, the more acute is the problem of the penny distance, as the greater is the cost per passenger.

With a view to illustrating this point fully, it may be as well to apply a series of figures to the fixed and variable charges per car-mile already ascertained. The number of passengers booked per car-mile run may be taken as 11 or 12, and the average load per car-mile run may be taken as anything from 16 to 23,

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varying with the average length of journey taken per passenger.

The following table gives the results :—

Passengers booked per car-mile	Actual 11·39				11			12	
Average journey taken, estimated miles	—	1·45	1·55	1·64	1·50* 1·58* 1·73	1·67	1·75	1·83	1·92
Passengers carried per car-mile or average load ...	—	16	17	18	19	20	21	22	23
	d.	d.	d.	d.	d.	d.	d.	d.	d.
Fixed charges to be levied per passenger booked ...	Actual 6·23	·57	·57	·57	·57	·52	·52	·52	·52
Variable charges to be levied per passenger booked per car-mile	6·91	·43	·41	·38	·36	·35	·33	·31	·30
	13·14								
Proportion of total charges attributable to carrying a passenger one mile ...	1·00	·98	·95	·93	·87	·85	·83	·82	
Miles which passenger could be carried profitably for one penny	1·00	1·05	1·13	1·19	1·37	1·45	1·55	1·60	
Distance which could be allowed for a penny fare, assuming each passenger travelled on the average 75 per cent. of the full distance ...	1·33	1·40	1·51	1·59	1·83	1·93	2·07	2·13	

* Based on 12.

The disparity between the row of figures showing the estimated journey taken and the row of figures showing the miles which a passenger could profitably be carried for a penny indicates the disparity which exists between the scheme of fares and the cost of service, when the average fare by good luck is also a penny. The argument of the first note still stands, that the general level of fares on the L.C.C. system needs to be raised for safety, particularly when the exceptional factors now assisting their operation are removed.

Looking at the table last given, there is a further comment to be made. It may be said that the table shows that given a good load factor, two miles can be afforded for a penny. Before jumping to this conclusion, it is as well to compare the average journey taken with the distance allowed for a penny fare, when it will be seen at once that the assumption that a passenger only travels 75 per cent. of the distance offered is falsified right at the start. With an average load of 22 to 12 passengers booked per car-mile, the average journey taken is 88 per cent. of the full distance allowed. If the passengers booked were increased to 13, it would still be 81 per cent., and at 14 would be 76, which illustrates the extent to which the operating efficiency must be improved. Actually the case is even worse for the longer the distance offered for a penny, the less the proportion of the full distance which will be travelled on the average. That is to say, the statistics and the assumption have moved in opposite directions, and the breach to be filled is really wider.

These rather detached notes only carry the argument a little nearer to the end. Someone with more time and less cares should work the whole position out to a conclusion. The writer would apologise for this rather tentative effort.

Results of Fare Revision at Walthamstow.—Mr. Wm. Murray, manager of Walthamstow Tramways, in his annual report for the year ended March 31 last, says that since the construction of the tramways the Council has sought to give the cheapest possible travelling facilities and at the same time to make the department self-supporting. They succeeded in the latter ambition in 1910, 1911, and 1912, when the advent of motor omnibus competition gave them a set-back, and it became evident during the succeeding years that some change must be made if the department was to pay its way. It was finally decided to abolish halfpenny fares for adult passengers, to discontinue issuing cheap return tickets, and to increase the price of workmen's tickets by 50 per cent. The change has been amply justified by its results. The traffic revenue for the year increased by £9,518, and the net balance was £6,800, as against £816 during the previous twelve months.

THE SPIRIT OF THE TIMES.

By Capt. P. H. DI MARCO, R.E., A.I.E.E.

Frankness is a charming quality. This article is frank—very frank. The reader may complete the syllogism as it pleases him. The writer has been out of live practice since the autumn of 1914. Most of his time since then has been spent in France, but what spare time came his way on those rare occasions when he was behind the line was expended, from an interested observer's point of view, in as exhaustive a study as possible of the various tramway systems of the localities in which he happened to be.

There is little new in this article—a few odd points perhaps rather forcibly emphasised, a strong conclusion—some will probably say a wrong conclusion, and no statistics. Perish the thought! The writer is much too modest to claim any intimacy with the word. No! Statistics *per se*, and within the meaning of the Act, so to speak, will never dim the lustre of this effort. The only claim for this article is that it very inadequately expresses the few reflections of one who once imagined he could distinguish the difference between the two ends of a tramcar. And now to our "muttons."

CO-ORDINATION.

At one place many of you know is a small concern running about eight kilometres of tramways with the overhead system, but instead of the wheel trolley method of collection the bow method is used. That is all. That is the only point worth noting. After careful study, under many trying conditions, the writer is convinced that it is the safest from a public point of view, and the most economical. If tramways were all bow-equipped to-day how much in running expenses would be saved, what wear and tear would be prevented, and what consequent economy would be secured!

At another place the longitudinal wood sleeper is freely used as a margin on each side of the rails, and setts in between. Many of these sleepers must have been down for years, in the busiest parts and on all sorts of gradients, and the life of them seems almost eternal. If English practice included the substitution of wooden sleepers for granite setts or macadam, how much in permanent way repairs would be saved?

In many of the towns the streets are very crowded, very hot, and very narrow. Some are so narrow that two vehicles have scarcely room to pass. The pathways also are narrow. Six people in a group would almost block up the street. Tramway lines run along the side of such streets, and each car has one, and sometimes two, trailers running under the heavy conditions of rush, fetes, and market traffic, and never an accident, hold-up or any inconvenience to anybody or anything to speak of.

If tramway authorities to-day could obtain powers freely to use trailers, how much economy would be effected, and how much would the revenue be increased. Why not trailers as a general practice? And if not, why not?

In French tramcar building provision is made for carrying passengers on the open platform at each end. In one town fifteen was the maximum number allowed on each platform. Trailers also were used, and women drivers, women conductors, women point setters, and probably many other women employees. Away the cars went, up the steep gradients and narrow streets to the heights above—and everybody was happy.

The heavy Juggernaut double-deck cars of Britain are not out of date—by no means; but if they had been strangled in their birth it is probable that, apart

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from the great reduction in general expenses which would have ensued, many labour questions and their inconveniences would have been avoided.

Authorities, municipal and otherwise, have doubtless considered the advantages of the various types of car now in existence in the kingdom, but there is no British standard, and in that respect we still muddle along. Like the walrus and the carpenter who "wept like anything to see such quantities of sand," it makes one weep like nothing on earth to see such quantities and varieties of cars. If they "were only swept away it would be grand," and replaced by a standard. What an ideal!—bodies, trucks, spare parts, fares, mileage, and even systems—all standardised. Conditions of labour, profit and loss, rates of pay—all standardised. Employers and employees all sharing directly in the prosperity as well as the hazardous risks of their undertaking. All the municipalities and private concerns standardising, and federating, and pooling the net financial result.

This sounds like a tramway Utopia. In short, it sounds a mad ideal; but is it? Think it over. Then think it over again, and consider the mountains of difficulties between capital and labour, parliamentary and local authority procedure, finance, and administration, books and forms, and a thousand superfluous and extravagant things—all gone, no longer to disturb the peace of, or increase the anxieties of, those engaged in traffic affairs.

Is it a dream? Is it not rather the very trend of present day industrial development? The dawn of the new spirit of new after-war conditions. He who runs may read, for the moral is obvious.

A tramways minister! As the Psalmist said, "Let him arise, and let his enemies be scattered." It is worth a thought.

Co-operation.

It is assumed that everyone engaged in the tramway industry will understand what is meant by the Union. To the writer it means "The Tramway and Vehicle Workers' Union." Please do not blush or turn pale. There is no necessity for anything but a few dispassionate moments. The writer loves the rolling sound of the title of this tramway organisation as well as he loves the restraint, generally speaking—mark you, generally speaking—with which its objectives have been invariably attained.

A union should be one of the finest blessings ever conferred upon an industry. You are not expected to swallow this statement right off, but you will in time, so soon as its enormous importance dawns upon your professional horizon; meanwhile it is offered "free, gratis, and for nothing." It simply reiterates a fact which, however well understood by employees, has not always been sufficiently intelligently absorbed by all employers.

The real and true spirit of a union is usually well and carefully planted by its officials and members on the one side, but the cultivation, nurture, and recognition so necessary for its successful existence have been equally well and as carefully neglected, or at best simply tolerated, by some of "those who shouldn't," on the other side. The fruit therefore can never fail to be sour and disappointing, yielding at best a bad "pip" to each side.

Now this should not be. One hesitates to describe it as "mutual distrust." What it really is, however, is mutual ignorance, which is a much less malignant disease than mutual distrust.

Some people will not like this plain speaking, but, like a great many other things in this changing kaleidoscope of industrial life, like it or not it is in our best interests to have to know it.

Probably it will be imagined that the writer holds a brief for trade unionism. Nothing of the kind. He knows nothing about the union referred to above; he does not even know the location of its headquarters, and has never read any publication emanating from it, but he has seen, he has heard, and this article represents his conclusions from the straight, practical point of view.

Two great tonics are required to ensure the success of a great industry, viz., a union and mutual confidence.

Now, how best can mutual confidence be achieved? By the diligent study of the broad principles of trade unionism, the huge obligations of capital and labour and the enormous mutual advantages of sharing the profit or loss.

The writer suggests that all tramway managers should well acquaint themselves with the details and objects of the different unions which come to their professional notice, identify themselves as fully as possible with their aims, and cultivate invariably a sympathetic attitude when dealing with trade union matters with employees, because in this way not only is a manager likely to obtain the esteem and best efforts of the employees, but he is more qualified correctly to advise his committee or board whenever such questions come up for consideration. Further, it is suggested that committees and boards should encourage this social study on the part of their principal officials.

And now a word for the employees. It is not every employee who is a member of a union. He should be, however, where unions exist, because, apart from his own interests, his aloofness from the trade organisation is very frequently the source of grave trouble, friction, and anxiety to all concerned. There is nothing to gain in being "odd man out" if the unanimous feeling is that you should be in. It is not fair to the employers. The mutual confidence previously referred to begins with the first step taken to become a member. Having done so, the employee should not imagine that he is now free to adopt a generally lax attitude, or is to content himself with doing the barest minimum of work possible, because that sort of thing is not playing the game.

His responsibilities and obligations have only just begun. He is responsible to his union, to his fellow workers, to his employers, and, most important of all, to himself, that he does not let them down, thus losing his own self-respect. Gently, yet firmly, treated, he will not make mountains out of molehills; he will take the rough with the smooth, and do his level best to understand and conscientiously perform the duties allotted, so that, sooner or later, promotion and advancement may come, with the result that capital and labour are both proud of their sons of industry.

All this may sound very like twaddle, but the tremendous point the writer wishes to emphasise is that the trade unions have become an integral and vital part of modern industry. They have arrived, and too few attempts are made generously and broadmindedly to recognise their efforts in the direction of consolidating man power and their ability to do so.

There is not only dignity of labour but dignity of capital, and the controlling powers of these industrial forces should be harmoniously animated with the dignity of mutual responsibility and all that it implies, and if they can work together as a joint committee so much the better.

Railway Restrictions.—Intimation has been given that the public must be prepared for a further reduction of railway facilities in October, for the exigencies of the military situation have compelled the railway authorities to consider the further restriction of services.

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THE
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LONDON, AUGUST 16, 1917.

The Transfer Problem in London.

Mainly because of fraudulent use, and of difficulties in checking, transfers are not popular among tramway managers. The original reasons that led to their issue were the convenience of passengers and a desire to avert the payment of an unduly increased proportionate fare entailed by two separate tickets having to be taken. Increased costs of working owing to the war, combined with a desire to lessen the work of depleted staffs, have led to the placing of restrictions on the issue in some towns and to the abolition of transfers in others. In connection with the prolonged consideration given to fares on the London County Council's tramways, some alterations have been effected in the regulations for the issue of transfers. While in the main the changes are to be commended, considerable care will need to be exercised to avoid their resulting in an adverse effect on the revenue. The reason is the existence of competition; and it was to assist in averting the effects of this competition that the Highways Committee have during the past few years sanctioned extensions of the use of transfers. Until the institution of the restrictions upon the importation of paper, the department had so well advertised the transfer facilities that their conveniences are firmly fixed in the public mind to the benefit of the traffic receipts. "Don't wait! Take the first car!" had become the best known slogan in the Metropolis, and passengers who availed themselves of the invitation had a further favourable impression made upon their minds by the extensively advertised facility for changing cars at any one traffic junction convenient to themselves. Added to these advantages was the facility thereby given for using more than one route to a destination, according to the passenger's convenience. Unfortunately on some routes, mainly used by munition workers, a practice had been allowed by conductors to arise during the war of permitting a change of car to be made at two points instead of only one. This innovation opened a door to great abuse if a passenger were so inclined, as the tickets are not printed to permit of more than one punch mark before cancellation. While it would not be impossible to frame a ticket that could be so dealt with by the conductor, the present time is not opportune for the innovation. Naturally, therefore, the practice has been forbidden. A change with a still wider effect is the abolition of the facility hereto given to holders of workmen's tickets to make a return journey via a route other than the one by which they travelled in the morning. This advantage was also conceded in the case of the ordinary return ticket; but as the latter has now been suspended it would have pampered the already too favoured workpeople to permit the continuance of the privilege to them. Consequently the Council have decreed that the return journey must be made on the same section as that on which the ticket was issued. While the new regulation will enable better oversight of workmen's tickets to be maintained, it may possibly be found to lead to congestion. Obviously "workmen" are got away from the busy loading points on the Victoria Embankment more expeditiously if they are allowed a choice of routes. Two new restrictions that will need to be carefully watched are those by which transfers are to be issued only where there are no direct services, and that the tickets will be available for change of cars at specified points only. The first of these regulations

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renders futile the exhortation to "take the first car," as passengers have done, changing on a transfer at a point through which more than one section of line is merged on the way to the Embankment. As to the second new rule, there are routes upon which many passengers change cars at a quieter and safer spot than that which is declared to be the place for changing. It remains to be seen whether the public will consent to be forced to journey by specified routes instead of being allowed to travel with a transfer. Many may elect to use another class of vehicle that stands invitingly by the side of the pavement.

Industrial Research. The British Department of Scientific and Industrial Research have published the first of a series of papers bearing on industrial research. This first number relates to the United States of America. Much help should be obtained in the task of readjusting the sense of scale in this country in dealing with the problems of industry by a realisation of the progress made in the United States. The present report, of which the compiler is Mr. A. P. M. Flemings, was prepared for publication by the courtesy of the directors of the British Westinghouse Electric and Manufacturing Company, of Pittsburg. Well illustrated descriptions are given of laboratories in America, and we have a discussion of legislative and other influences tending towards the nationalisation of research. Then comes a consideration of the increasing necessity for research in this country and suggestions for the development of such work. Mr. Fleming draws a number of conclusions. For example, he says that the full benefits of scientific investigation will not be obtained unless the results are applied by suitably trained men. The development of research on a large scale will tend to attract to the ranks of industry many of the ablest young men, who nowadays enter non-productive professions. In view of the expenditure involved, great need exists for bringing continually before the public the necessity of industrial research, with its possibilities and benefits. A new phase in industrial and economic life is commencing, and its development will be governed very largely by the extent to which new scientific knowledge is obtained and turned to the benefit of mankind. There is a mass of interesting and useful material in the book, and no doubt there will be differences of opinion on some of the points. Every manufacturer and educationist should study the work, for the process of awaking this country to the need for such research carried on systematically on a large scale is by no means complete. Even if it were, the work for the most part still lies before us of providing the machinery. We may take it for certain that after the war the elaborate organisation of the Germans in this direction will become still more elaborate, with the object of making up what they have lost. This country must not be behind in the race.

Employers and Employed. There is much wisdom and there are useful proposals in the interim report issued in July of the Sub-Committee (or Reconstruction Committee) on Relations between Employers and Employed. An initial difficulty in carrying out the proposals lies in the fact that there is so much of instability and uncertainty in connection with the acceptance and carrying out of any general scheme by the working classes. Even when the adherence of the heads of the trade unions is obtained, the doubt remains and is often justified as to whether the many-headed rank and file will agree and whether, if they do agree, they will steadfastly adhere to the bargain. Subject to these considerations, the proposals of the Sub-Committee appear to be promising. Appointed with Mr. J. H. Whitley, M.P., as chairman, who, as shown in his office of Deputy Speaker and Chairman of Committees of the House of Commons, possesses both firmness and tact, the Sub-Committee's business was to make and consider suggestions for securing a permanent improvement in the relations between employers, and workmen and to recommend means for securing that industrial conditions affecting the relations between employers and workmen shall be systematically reviewed by those concerned. In this interim report the Sub-Committee have confined themselves to the problem of establishing permanently improved relations between employers and employed in the main industries in which there exist representative organisations

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on both sides. The war has enforced a reconstruction and has also made the time opportune. The co-operation of all classes must be continued after the war, and the financial condition of manual workers must be improved. Industrial conditions will need careful handling if grave difficulties are to be avoided; for the workers will be found far less tractable than hitherto. These things being so, the Sub-Committee recommend that the Government should propose to associations of employers and employed the formation of Joint Standing Industrial Councils in the several industries. These Councils should particularly direct themselves to the establishment of a closer co-operation between employers and employed. For the establishment of the new regime it will be necessary by mutual consent to set aside the guarantees given by the Government to restore trade union rules suspended during the war. Local and works organisations are also proposed. For the numerous subjects to be considered by all these new bodies, reference must be made to the report itself. Here it can only be pointed out that the work proposed is a gigantic one. It not only involves the setting aside of many baneful trade union ideas, but the creation of new industrial ideas under which the workman would not only have more influence upon industrial management and greater security and remuneration, but would have to become a co-operator in the development of his industry with his heart in the work. Not merely wages, but technical education, industrial research, facilities for utilisation of inventions, and many other things would come within the purview of the bodies to be established. In fact, if everything foreshadowed in this report could be brought about, we should have a new industrial world. All concerned must try to make such a scheme a success. The newly-formed Industrial League, to which reference is made elsewhere in this issue, is in full agreement with the proposals of the committee; and those who are anxious to aid in the encouragement of harmonious relations between employer and employed will discover practical ways of assisting the movement by investigating the objects and methods of the new association.

LONDON SAFETY COUNCIL.

Although the London Safety First Council only came into existence during the latter half of last year a large amount of exceedingly useful work has been accomplished in the education of drivers and the public. A number of committees of the Council have formulated various spheres of activity in the campaign, which is an enlargement of the work that the London General Omnibus Company carried on for several years. Below particulars are given of developments adopted at the July meeting of the Council, notably a competition in freedom from accidents for drivers of all classes of vehicles. An effort is also to be made to institute a campaign in the elementary schools.

Another branch of the work is the issue of posters and leaflets. Poster No. 1 and Leaflet No. 1, entitled "Hints to Drivers," which contain the rules of the road, hand signals, etc., have proved to be very helpful in reducing accidents. Poster No. 2, which was issued last month, is entitled "Dont's for Drivers of All Classes of Vehicles." It is illustrated by the photographs reproduced on page 107. The introductory paragraph mentions that since the war began over 2,000 persons, of whom 700 were children under 15 years of age, have been killed in the streets of the metropolitan area. It is believed, the poster adds, that many of these accidents were avoidable, and an appeal is made to drivers of all vehicles to exercise every care. Then follows a dozen suggestions based among other things on the advice attached to the accompanying illustrations, which depict incidents that may be seen in almost any street.

Copies of the posters and leaflet may be obtained from the Joint Hon. Secretaries, London Safety First Council, 31, Westminster Broadway, S.W.1, who will be glad to receive suggestions for the furtherance of the movement.

MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The annual business meeting and conference of the Municipal Tramways Association will be held at Blackpool on Thursday and Friday, September 20 and 21. The last two meetings took place in London, and in view of the fact that a large number of the members come from the north, and owing to the increased railway fares and limited hotel accommodation at the present time, it was felt that a meeting in the north would meet the wishes of the members.

Thursday, the first day, will be devoted to the discussions and the second day to the annual general meeting. Reports upon the following subjects will be presented and discussions will follow:—

"Principles to adopt to ensure the highest net earning capacity," by Messrs. G. W. Holford, general manager of Salford Corporation Tramways, J. Barnard, general manager, Bolton Corporation Tramways, P. Priestley, general manager, Oldham Corporation Tramways.

"Rules of the footpath," by Mr. James Dalrymple, general manager, Glasgow Corporation Tramways.

"Differentiation in tramway fares," by Mr. W. Murray, manager, Walthamstow Council Tramways.

"Development of tramways." (The name of the opener of the discussion has not yet been communicated).

The headquarters of the association will be at the Savoy Hydro, North Shore, Blackpool, where the meetings will be held. Following the arrangements which have met with the approval of the members for the past three years, there will be no public functions.

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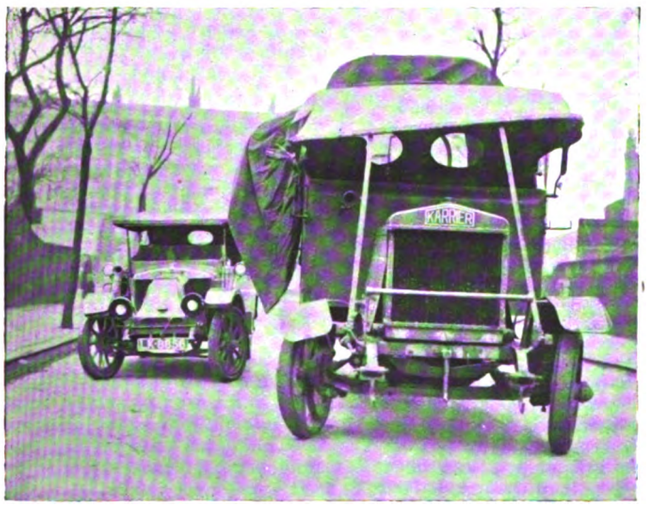
LONDON SAFETY COUNCIL'S DON'TS FOR DRIVERS.

Don't Doze.

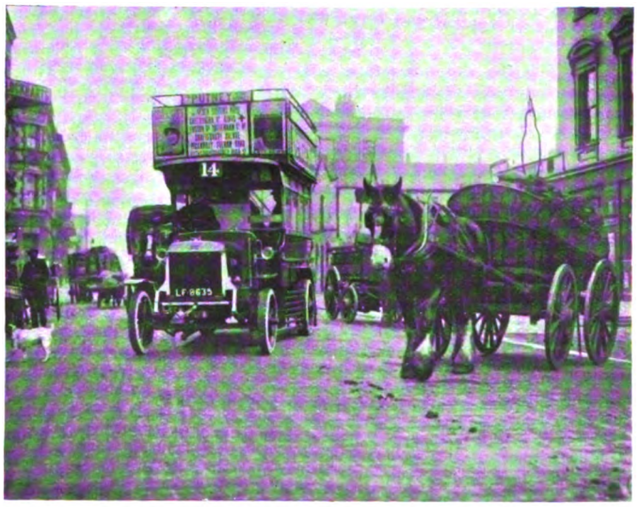
Don't Ignore Cyclists—They are Liable to Side-slip.

Don't Regard Children as Grown-ups.

Don't forget that some Pedestrians are deaf, others short-sighted.



Don't Fail to Tie Down the Tarpaulin.



Don't Leave Your Vehicle Unattended.

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RECENT LABOUR DIFFICULTIES.

Burnley.

Owing to a local dispute between the men's unions a strike of the drivers and conductors on the Burnley Corporation Tramways took place on July 14. The general manager issued a notice pointing out that the strike was contrary to the understanding between the executive committee of the Tramway and Vehicle Workers' Union and representatives of the tramway authorities of Lancashire and Cheshire, and that no complaints or requests had been made to Burnley Corporation. The latter body, however, showed a conciliatory spirit, despite the unjustifiable nature of the strike, but as this proved unavailing, they issued advertisements for new employees. Some negotiations followed, and on July 23 the General Purposes Committee of the Corporation, after a meeting with officials of the two unions concerned, resolved that before negotiations could be entered on with reference to the dispute between the two unions the men must resume work. The result was that the strikers went back to their duties.

Edinburgh.

An arbitration between Edinburgh Tramways Company and their employees was conducted on July 19 by Sir Richard Lodge, who afterwards issued the following award:—(*a*) Pointsmen, drivers, conductors, and regulators—that a war bonus of 5s. per week be paid to men employed as above, and also to depot staff, pit and pulley greasers. (*b*) That a war bonus of 2s. 6d. per week be paid to conductresses. (*c*) That a war bonus of 1s. 6d. per week be paid to boys under 18 years of age. (*d*) That time and a half rates be paid for Sunday duty between 6 a.m. and 12 midnight to the departments not already in receipt of the same, with the exception of the splicers and to the employees who are not paid on time rates but receiving a weekly wage. (*e*) That the above payments be reckoned from the first pay-day following the issue of this award. (*f*) That while the company pay the war bonus as granted above, the free passes shall be withdrawn, but all employees shall be carried free when going on or off duty or on any journey connected with the fulfilment of their duties to the company.

Leicester.

Leicester Town Council held a special meeting to consider a report by a committee recommending that the employees of the Council receiving under £200 a year should be paid a 12s. war bonus, and that women employees should be paid a 10s. war bonus. It was explained that all the bonuses granted since July, 1914, would be calculated as part of the 12s. The Mayor said that the proposal meant the addition of £26,922 to the previous bonuses, which amounted to £39,004. The total was practically equal to a 1s. 3d. rate. Alderman Banton moved an amendment to make the bonus 12s. to both men and women. The Tramways Committee, he said, had arranged that women who took on men's work should receive the same pay as the men. In the course of discussion it was asserted that if the women did not get equal treatment there would be unrest and possibly a strike. After an adjournment to allow the committee to look into the matter, the Mayor said that they could find no document which justified the assertion that there was an agreement that women were to be paid the same wages as men. The minutes of the Tramways Committee showed that the men were to have a 12s. bonus and the women a 10s. bonus. He suggested that the Council should pass the recommendation now before them and then apply to Sir George Askwith for a ruling regarding the women having the same bonus as the men. Alderman Flint stated that at first the women, although paid the same rate per hour as the men, were given shorter hours. They were, however, now working practically the same hours as the men. Ultimately the Mayor's proposal in its amended form was adopted.

Manchester.

The trouble in connection with the Manchester tramway employees has at last been settled. It will be remembered that they maintained that they ought to have a higher war bonus than that awarded to them and to other tramway employees in Lancashire and Cheshire. Early in July the men in Manchester threatened to convert their "stay-in" strike to an actual stoppage of work, but this was defeated on a ballot being taken. It had been pointed out to them by the Ministry of Labour that a strike would be illegal, and a further arbitration was offered and accepted. The re-hearing took place before Sir George Askwith on July 16, and the decision was announced three days later to the effect that there was no reason for a departure from the award of June 11. That award increased the existing war wages advances from 6s. 6d. to 9s. per week for men and from 3s. 6d. to 6s. a week for women.

The Derbyshire and Notts Tramways Act received the Royal Assent in the House of Lords on July 11.

Light Railways Acts.—The Board of Trade have recently confirmed the following order made by the Light Railways Commissioners:- Darlington Light Railways (Amendment) Order, 1917, amending the Darlington Light Railways Order, 1902.

LONDON COUNTY COUNCIL TRAMWAY ACCOUNTS.

Year Ended March 31, 1917.

A meeting of the London County Council on July 17 received and adopted the accounts submitted by the Highways Committee for the year ended March 31, 1917, together with a report by the general manager on the working of the undertaking.

The tramways system on March 31, 1917, extended over a total length of 149 street miles, of which 144¼ miles were electric lines and 4·6 miles disused horse lines. During the year the only construction work undertaken was the doubling of certain portions of single line in Woolwich.

The following tables give the total income from the undertaking during the year, and the working expenses compared with the results in the three preceding years are given below:—

Year ended March 31.	1917	1916	1915	1914
	£	£	£	£
Income	2,552,203	2,339,291	2,399,487	2,268,669
Working expenses*	1,817,694	1,683,660	1,700,212	1,615,467
Surplus on working	734,509	655,631	699,275	653,202
Deductions—				
Debt charges—				
Interest	314,164	326,477	330,300	—
Redemption	429,851	425,908	405,605	—
	744,015	752,385	735,905	736,602
Rent drawbacks, etc. ...	7,551	6,797	1	—
Income tax	73,000	40,000	32,102	28,197
Parliamentary expenses ...	18	2,260	2,803	2,082
Amount due to Metropolitan Electric Tramways, Limited, under through-running agreements ...	1,521	—	—	—
	826,112	801,442	770,811	766,881
Less tax deducted, interest on cash balances, rents, etc.	102,945	72,061	38,363	25,153
Total deductions from surplus	723,167	729,426	732,448	741,728
Balance	£11,342 (Surplus)	73,795 (Deficiency)	33,173 (Deficiency)	88,526 (Deficiency)

* Includes war service allowances, 1916-17, £110,155; 1915-16, £95,365; 1914-15, £42,200.

The renewals fund amounted on March 31, 1917, to £282,978 0s. 5d. Previous to the year under review there has been no payment into this fund since the year 1912-13, except interest paid on investments and amounts received from the London United Tramways, Limited. The general reserve fund on March 31, 1917, amounted to £72,390 10s. 9d. In the case of both funds the balances stated take no account of the depreciation of investments. Operating expenses were £1,694,609 6s. 9d. (excluding war service allowances of £110,155 12s. 10d. and certain special charges amounting to £12,928 19s. 9d.). The total number of passengers carried during the year was 586,127,976, and the number of car miles run was 49,478,973. The corresponding figures for 1915-16 were 545,423,397 and 47,879,675.

The following table gives particulars of the length of electric track open and receipts for the eleven years ended March 31, 1917:—

Year ended March 31.	Average track miles.	Average receipts per track mile.	Gross passenger receipts.
		£	£
1907 ...	40·66	19,929	810,320
1908 ...	61·91	20,223	1,252,001
1909 ...	77·94	19,752	1,539,434
1910 ...	99·61	18,546	1,847,327
1911 ...	116·98	17,925	2,096,914
1912 ...	127·55	17,498	2,231,902
1913 ...	132·49	16,179	2,143,559
1914 ...	136·62	15,967	2,181,344
1915 ...	140·66	16,516	2,323,130
1916 ..	141·52	16,097	2,278,115
1917 ...	141·67	17,479	2,476,309

Capital Expenditure.

Capital expenditure on the undertaking up to March 31, 1917, amounted to £13,570,119 1s. 11d., of which £53,542 4s. 4d. was incurred in the year 1916-17. The total amount of the debt incurred was £13,930,059 17s. 7d. The net debt on March 31, 1917, i.e., the debt outstanding, less the sinking fund in hand and less £120,216 in respect of the value of surplus land, was £9,141,826 6s. 8d.

The amount of capital expenditure, which up to March 31, 1917, had become obsolete owing to the electrification of horse tramways,

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was £2,024,687 15s. 3d. The amount still to be provided for in respect of the debt under this head is £943,740 15s. Certain other expenditure amounting to £117,829 15s. 4d. incurred in connection with electric traction, has also been rendered obsolete.

RATES AND STREET WIDENINGS.

The sum paid as rates on the permanent way amounted in 1916-17 to £64,413 7s. 10d., and represents an average relief to the rates of London of about ½d. in the £. The saving to the road authorities in consequence of the obligation of the Council to maintain the paving along the tramway routes is estimated by the Council's officers at about £140,000 a year on the present mileage. The amount chargeable to the tramways account in respect of the cost of effecting street improvements up to March 31 last was £774,039 12s. 7d.

LONDON COUNTY COUNCIL TRAMWAYS REORGANISATION.

NEW APPOINTMENTS.

During the past few months the London County Council has accepted recommendations of the Highways Committee for carrying into effect certain proposals with regard to the organisation of the tramways department contained in the report presented to the Council on February 20 last, which was given in full in our issue of March 15.

Under the scheme adopted with the object of freeing the general manager, Mr. A. L. C. Fell, from an immense amount of detail work which, with the growth of the undertaking, had gradually been thrown upon him, it was arranged that the tramway department should be sectionalised, and that each section should be provided with executive heads and the necessary assistant officers.

ENGINEER OFFICERS.

The first step in giving effect to the new scheme was the appointment in May last of an electrical engineer to take charge of the work of the electrical branch. It had been decided that the salary assigned to the position should rise from £1,200 by annual increments of £50 per annum to £1,500. In response to advertisements forty-five applications were received. Twelve of the applicants who appeared best qualified were selected and seen, and later the committee had interviews with six of these candidates. As a result they recommended the appointment of Mr. Philip Lyle Riviere, an engineer on the staff of Messrs. Kennedy and Donkin, the consulting engineers, who had been intimately associated since 1901 in connection with his work for Messrs. Kennedy and Donkin with the electrification of the Council's tramways, and in particular at Greenwich generating station. The recommendation was accepted, and Mr. Riviere was appointed to the position on May 22 last.

The other positions in the electrical branch, as now arranged, are as follows:—

Superintendent of Greenwich generating station, to be styled power-station engineer; salary £500, increasing by four annual increments of £25 and two of £50 to £700 a year.

Resident electrical superintendent (southern section) to be styled distribution engineer (southern section); salary £400, increasing by annual increments of £25 to £600 a year.

Resident electrical superintendent (northern section) to be styled distribution engineer (northern section); salary £400, increasing by annual increments of £25 to £600 a year.

On the recommendation of the Highways Committee the following appointments were made:—

Mr. E. W. Dickinson, superintendent of Greenwich generating station, to be the power station engineer at a commencing salary of £500.

Mr. E. L. Pope, resident engineer, to be distribution engineer (southern section).

Mr. T. L. Horn to be distribution engineer (northern section), the commencing salary of each to be £500 a year.

OFFICERS OF THE ROLLING STOCK BRANCH.

The scheme of reorganisation provided for the appointment of a rolling stock engineer, who should be the officer in charge of the rolling stock branch. The salary assigned to the position is £1,000, increasing by annual increments of £50 to £1,200 a year. In reply to an advertisement thirty-two applications for the appointment were received. The Highways Committee examined the applicants, and reported that they did not feel justified in recommending the appointment of any candidate to the position.

The principal officer in the rolling stock section is Mr. W. E. Ireland, rolling stock superintendent, whose salary has been £525 a year, and the committee recommended that, having regard to his experience and qualifications, he should, as a temporary arrangement, act as rolling stock engineer. As the position would place upon Mr. Ireland additional duties and increased responsibility, the committee recommend that he should receive a special allowance of £225 a year.

The reorganisation scheme provides that upon the appointment of a rolling stock engineer the present positions of rolling stock superintendent and assistant rolling stock superintendent should be abolished; that a position of rolling stock superintendent with a salary of £400 a year, increasing by annual increments of £25 to £600 a year, be established, and that a salary of £400, increasing by annual increments of £25 to £600 a year, be assigned to the position of superintendent of the central car repair depot.

The committee proposed that Mr. H. S. May, assistant rolling stock superintendent, should discharge temporarily the duties of rolling stock superintendent in the branch as reorganised, and while thus acting he should receive in addition to his salary of £325 a year an allowance of £75 a year.

It was also recommended that Mr. G. W. Knight, superintendent of the central car repair depot should act temporarily in the position similarly designated under the reorganisation scheme, and while doing so should receive an allowance of £100 a year in addition to his salary of £300 a year.

OFFICERS OF THE PERMANENT WAY BRANCH.

Under the reorganisation scheme it was proposed that a permanent way engineer should be appointed, with a salary of £800, increasing by annual increments of £50 to £1,000 a year. In reply to an advertisement thirty-nine applications for the position were received, but the committee reported on July 31 that they did not feel justified in recommending the appointment of any candidate. They recommended that Mr. J. B. Welling, who has held the position of permanent way engineer since 1901, should be placed in the position of head of the permanent way branch as a temporary arrangement. His present salary is £600 a year, and it was agreed that he should receive an additional allowance of £100 a year.

Mr. J. R. Wignal, technical assistant in the general section, was assigned temporarily to the permanent way branch, and is to receive an allowance of £100 a year in addition to his salary of £340 a year.

CHIEF CLERK OF GENERAL BRANCH.

The reorganisation scheme provides for a chief clerk who would hold the position of head of the general branch. Mr. W. P. Farquharson, the general assistant, was appointed to this position on July 31. His salary is £600 a year, and at present he has supervision of most of the departmental sections which under the scheme will be organised in the general branch. The proposals for the reorganisation of the general branch the committee intend to submit to the Council as soon as possible, when the question of making a permanent appointment to the position of chief clerk will be considered.

DEVELOPMENT SUPERINTENDENT.

Mr. Theodore E. Thomas was appointed development superintendent on June 19. This appointment was also made in accordance with the reorganisation scheme. Mr. Thomas will take charge of the development and publicity section, as set out in the report, which provided that the minimum salary should be £500 per annum, rising by four annual increments of £25 and four of £50 to £800 per annum, but gave authority for an appointment to be recommended at other than the minimum salary.

In reply to an advertisement inviting applications for the position 38 applications were received. Nine of the candidates were selected and interviewed, and after personal interviews with four of the candidates the committee recommended the appointment of Mr. Thomas, who is at present commercial superintendent of the Metropolitan District Railway Company, the London General Omnibus Company, and allied companies. In view of his experience and his present position, the Highways Committee recommended that his salary under the Council should be £800 a year.

THE INDUSTRIAL LEAGUE.

What may be described as the inaugural dinner of this new association took place on July 20. It proved an occasion of exceptional interest, and was in every respect a successful beginning of what we hope may come to be a strong and influential factor in the effort toward industrial harmony. Mr. Lee Murray presided, and among those who took part in the proceedings were Sir Albert Stanley, Mr. George S. Roberts, Sir Archibald Denny, Mr. G. Wardle, Mr. H. S. Scholey, Mr. F. Huth Jackson, and Mr. H. E. Blain.

Several of the speakers expressed their views with unusual frankness and sincerity. The League has gradually taken form during the past two years as the result of a series of meetings between Labour leaders and employers that have taken place generally at the Eccentric Club. The gatherings have afforded a free interchange of opinion, and unanimity has been arrived at on the necessity of friendly co-operation between employers and employees in order to secure the expansion of industry. It is recognised that if this is to be secured adequate remuneration and security must be given to the worker, who on his part must make a better return than in the past.

The League proposes to form district associations, which will get into touch with the workers themselves, and bring them into contact with manufacturers, and it hopes particularly to interest the small manufacturer. The work will be carried on as vigorously as the funds at the disposal of the League allow, and generous promises of support have been made to Mr. Scholey, the hon. secretary, whose address is 50, Victoria Street, and who will be glad to give all inquirers further explanations of the genesis and objects of the League.

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FINANCIAL REPORTS AND MEETINGS.

Browett, Lindley and Company, Limited.—After providing for interest charges, and writing off £6,134 for depreciation, the net profit for 1916 was £9,450. The full year's dividend of 6 per cent. has been paid on the preference shares, and an extra distribution of 3 per cent. on account of arrears, and a dividend of 4 per cent. on the ordinary shares, leaving £3,540 undivided subject to excess profits.

Egyptian Delta Light Railways.—The receipts for the year ended March 31 were £232,927, compared with £192,927 in the preceding year, and the working expenses were £180,821, compared with £142,109. After providing for interest on debentures and fixed charges £106,807 remains. From this must be deducted the sum of £57,558 in suspense account. In consequence of the abnormal and increasing price of coal, stores, and materials, and the uncertainty for the future, the directors are unable to recommend a dividend.

Stalybridge Tramways.—The accounts of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways and Electricity Board for the year ended March 31 last show that the total tramway revenue was £44,186, equal to 9·504d. per car-mile, while the working expenses were £29,498, or 6·345d. per car-mile. After paying capital charges, etc., and putting £2,828 to reserve, and crediting £7,000 raised from the Corporations concerned, there is a deficit of £5,202. At the end of the previous year the deficit was £6,734. The number of passengers was 10,016,837, and car-mileage 1,115,663.

Metropolitan Railway Carriage, Wagon and Finance Company.—The directors have announced that the Treasury has given its consent to the issue of shares represented by the proposed capitalisation of the part of the undivided profits and reserve and the balance of the present authorised capital in hand. The bulk of the issue, viz., £1,424,700, will be allotted to the shareholders. It was expected that the Treasury would give its consent, as the company is engaged directly in Government work and also in financing such undertakings as the British Westinghouse Electric and Manufacturing Company.

North Melbourne Tramways.—The report of the North Melbourne Electric Tramways and Lighting Company, Limited, states that the gross receipts show an increase from £33,462 to £40,358. The expenses—principally due to increased wages and high cost of materials and freight—increased from £21,730 to £28,888, the net revenue therefore being £11,470, as compared with £11,732 for the previous year. A contract has been entered into with the Melbourne City Council for the lighting of Flemington and Kensington. The necessary work of laying the mains and erecting the standards is being proceeded with as rapidly as possible.

Brazilian Traction, Light and Power Company.—The report for the year ended December 31, 1916, states that the surplus available for dividends was 5,674,642 dollars. After paying four dividends at 1 per cent. each, there is a surplus carried forward in profit and loss of 823,154 dollars. The decline in the surplus, as compared with the year preceding the war, is due to the fall in the exchange value of the milreis. Pending resumption of payment of dividends on the ordinary shares, the board propose to apply the surplus revenue from time to time in liquidating the floating indebtedness of the companies, and in providing for the necessary capital expenditure.

Sunderland Corporation Tramways.—The Sunderland Corporation Tramway receipts during the past year were the highest in the history of the undertaking, being £85,180, or over £6,000 more than the preceding year, while the total number of passengers carried was nearly 2,000,000 more than in any other year, being 21,711,489. Compared with 1898, the first year of the municipal undertaking, those figures show a great advance, the traffic receipts that year being £17,578, and the passengers carried a little over 3,000,000. The total income for the year was £85,513, and from the net profit £5,000 has been given to the relief of the rates, bringing the total sum applied in that way to £62,027.

Improvement at Walthamstow.—The twelfth annual report on the Walthamstow Urban District Council Tramways has been presented by the manager, Mr. Wm. Murray. It shows that for the year ended March 31 last the total receipts were £55,770, as compared with £45,874 in the preceding year. The net balance, after meeting all expenses, including repayment of loan and interest (£9,909) and war bonus and separation allowances (£1,700), was £6,817, against £816 in 1916. The revenue per car-mile was 11·86d., an increase of 1·45d. The passengers numbered 12,367,758, a decrease of 2,320,685. The mileage run was 1,128,029, an increase of 69,460. The highly favourable financial results compared with previous years is attributed to the abolition of halfpenny fares, which, on the recommendation of the manager, was carried out at the beginning of the financial year.

Shanghai Electric Construction Company.—The accounts for the year 1916 reveal a profit of £48,123, which compared with £31,084 in the previous year. Preliminary expenses account has been reduced by £5,000, and £10,000 has been carried to reserve for renewals. The dividend on the ordinary shares is 10 per cent. for the year, less income tax, leaving £2,510 to be carried forward. The loss by exchange on subsidiary coinage was £38,751. The net traffic receipts for the four months of 1917 show an improvement. The rolling stock now consists of 70 cars, 15 trailer cars having been added. Including seven railless cars, which are working successfully on one mile of route, there are 167 passenger vehicles. The directors think that considerable expansion in business can be obtained from the extension of railless car routes, and powers are being sought from the Municipal Council for the purpose.

Coventry Corporation Tramways.—Councillor Pugh, chairman of the Tramways Committee, in presenting the report of the department to the Town Council, said that there was a surplus of £7,667, and after writing off £1,033 as motor omnibus capital expenditure, and £388 for other items, there was a balance of £6,245, which would be transferred to the reserve and renewals fund. Owing to the increases in wages and the enhanced cost of material, it was impossible to recommend the allocation of any sum to the relief of rates this year. Considering all the difficulties of carrying on with the shortage of labour and material, he thought that the travelling public had much reason for gratitude to the manager and staff of the department. He also expressed appreciation of the splendid services rendered by the women. He had to warn the public that the increased wages would inevitably involve some readjustment of the tramway fares. Councillor Wale, in seconding the adoption of the report, remarked that the traffic problem of the city was one which must require very serious consideration in the future. He contended that by pursuance of the financial policy inaugurated by Councillor Pridmore the Council would confer a great benefit on the citizens, and ultimately be able to provide a tramway system second to none.

Bombay Electric Supply and Tramways Company.—The report for 1916 states that the total revenue from all sources, including the amount represented by sale of current to the tramways, amounted to £373,467, an increase of £62,697, or 20·17 per cent. The total expenditure amounted to £156,688, an increase of £14,597, or 10·27 per cent. The net receipts from the year's working aggregated £216,779, an increase of £48,100, or 28·52 per cent. over those for the previous year. After deducting debenture interest, depreciation, etc., there remains £114,373, and £9,602 was brought in, making £123,976. The directors now recommend a dividend for the year on ordinary shares at the rate of 10 per cent. per annum. They propose writing down securities to the extent of £6,666, and to pay a bonus of one month's pay to the company's officers and employees, leaving £5,214 to be carried forward. The gross receipts from the traction branch amounted to £198,765, against £172,051, an increase of 15·53 per cent. The working expenses amounted to £87,826, against £79,665, an increase of 10·24 per cent. The balance of receipts over expenses in respect of the year's working amounted to £110,939, against £92,387 for the previous year, an increase of 20·08 per cent. The gross receipts of the supply department, including the amount represented by sale of current to the tramways, amounted to £171,167, against £138,021. The working expenses amounted to £62,203, against £58,132. The net receipts aggregated £108,874, an advance of 36·28 per cent.

General Electric Company.—Presiding at the annual meeting on July 17, Mr. H. Hirst moved the adoption of the report, which showed that as compared with the previous year the gross profit had increased by 35 per cent., and the net profit 25 per cent. The ordinary dividend remained unchanged at 10 per cent. The sum of £40,000 has again been transferred to the reserve fund, and the total of this fund amounted to £400,000, with the addition of £100,000 placed to special reserve to cover pre-war contingencies. The grants to dependants of men on active service absorbed £11,500. All the allied and subsidiary undertakings have continued to do well with the exception of one or two which have been adversely affected by the state of war. The results for the last five years are set out below:—

Year ended Mar. 31.	Gross profit.	Net profit.	Ord. div.	Special appropriatn's.	Depreciation allowance.	Carry forward.
1913	145,300	93,200	10	33,000	24,500	32,300
1914	157,900	101,400	10	33,000	24,300	36,700
1915	164,900	114,300	10	27,500	18,900	36,700
1916	196,300	156,300	10	53,000	19,300	48,100
1917	265,200	195,700	10	62,000	30,500	89,800

In the course of an interesting speech Mr. Hirst said that the total net profit had increased by about £70,000, of which £30,000 was on trading account, and about £40,000 represented increase in revenue from investments. Their investments account, which had shown a steady yield of about 10 per cent., had increased by, roughly, £350,000, due mainly to their acquisition of shares in the Osram-Robertson Lamp Works, Limited, of which in the past thay had been only part-owners. He hoped the ordinary shareholders would approve their refunding this year the income-tax to preference shareholders by way of a special bonus. The ordinary shareholders were reaping the full benefit of the prosperity of the company by an increased dividend and by the appreciation of their shares. Of all the changes that would result from war in this country those in the electrical industry would be the most drastic. Replacement and reorganisation after the war would be a tremendous task for the existing electrical companies. War had taught the country the necessity of home production.

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Imperial Tramways Company.—Presiding at the ordinary meeting of this company in Bristol on June 27, Mr. Samuel White moved the adoption of the directors' report, and made feeling reference to the death of his brother, Sir George White, former chairman of the company. With regard to the Middlesbrough, Stockton, and Thornaby Tramways, though they carried more than half a million additional passengers, and their receipts exceeded £70,000 for the first time, there had been a considerable increase in the working expenses, with the result that the net revenue was over £1,000 below that of the previous year. The greatest credit was due to Mr. Freshwater, their manager, for the excellent manner in which he had discharged his trying duties. The Corris Railway had suffered from the abnormal conditions of the times. They had begun to build up a tourist traffic, but that had been knocked on the head. Their income for the year was £23,073, of which £14,228 was derived from the working of the Middlesbrough undertaking and the balance from dividends upon their other investments. It was sufficient to enable them to pay the 6 per cent. dividend upon their preference shares, interest upon their debenture stock, a dividend of 2 per cent. upon the ordinary capital, and to carry forward £123 19s. 10d. to the next account. When they returned to normal times there was no reason why things should not improve, and their business become extremely profitable. They could look forward with some degree of confidence to a better return upon their investments in the future. The report was adopted.

Southampton Corporation Tramways.—The results for the year ended March 31, 1917, as shown by the report of the general manager and engineer, Mr. W. T. Robson, were very satisfactory considering the special difficulties that prevailed. The abnormal prices of materials and heavy special war expenditure have, as elsewhere, constituted a great handicap. The receipts, which amounted to £88,183, an increase of £9,355, again formed a record. The gross balance of £16,669 has been appropriated as follows:—Sinking fund charges, £7,309; proportion of cost of new car, £796; third party, insurance fund, £256; depreciation and renewals fund, £5,218; and contribution to rates, £3,000. A summary of the accounts for the past five years is appended:—

Year ended March 31.	1917.	1916.	1915.	1914.	1913.
	£	£	£	£	£
Total revenue	88,183	79,828	71,038	70,598	66,534
Working expenses	56,745	48,617	48,617	46,521	47,049
Profit on working	27,177	26,854	20,732	24,077	19,485
Interest	10,508	9,123	8,336	7,708	7,675
Sinking fund charges ...	7,399	7,614	7,557	7,433	7,241
Depreciation fund	5,218	4,460	5,000	7,118	5,000
Special expenditure	1,052	1,939	—	—	1,422
Contribution to rates ...	3,000	5,000	5,134	2,360	—
Passengers carried	17,718,810	15,494,366	13,265,715	13,162,224	12,475,793
Fare per passenger	1·17d.	1·21d.	1·23d.	1·23d.	1·23d.
Car-mileage	1,813,547	1,636,103	1,703,032	1,543,941	1,533,638
Receipts per car-mile ...	11·67d.	11·71d.	10·01d.	10·97d.	10·41d.
Expenses per car-mile ...	8·07d.	7·77d.	7·09d.	7·23d.	7·36d.
Ratio of expenses	64	60	68	66	71

Burnley Corporation Tramways.—Mr. Henry Mozley, general manager, in his report for the year ended March 31, 1917, states that there was a profit on working of £25,352, slightly less than the amount in the previous year. There was an increase in traffic receipts of £4,064, although the car-mileage remained practically the same. Ordinary discount tickets and students' periodical tickets were abolished, but too late to have much influence on the results of the year. Wages showed an increase of more than £4,000 per annum above the amount at the beginning of the war. Within past three years £10,011 have been contributed as allowances to employees with the forces, income-tax has increased by £3,000, and there has been a like increase in wages. But for the conditions arising out of the war, the financial position of the undertaking would have been a great advantage to the ratepayers from a profit-earning point of view. The long continuance of the war and the demands of the military authorities continue to affect the staff seriously, but the efficiency of the service is surprising considering the conditions. The following summary gives a comparison of the results for the past five years:—

Year ended March 31.	1917.	1916.	1915.	1914.	1913.
	£	£	£	£	£
Total revenue	87,421	83,238	78,466	88,316	79,890
Working expenses	58,604	53,572	55,833	62,948	49,430
War allowances	3,211	4,312	2,483	—	—
Profit on working	25,352	25,606	20,150	25,367	30,460
Interest	6,401	6,552	6,797	6,938	5,661
Sinking fund	8,716	8,497	8,284	7,728	6,491
Rent for tramways worked	1,546	1,752	1,889	1,941	2,061
Income-tax on profits ...	3,729	2,541	1,515	1,072	892
Reserve fund...	5,222	—	—	—	5,790
Borough fund	—	6,010	1,664	7,687	8,750
Passengers carried	17,068,753	16,946,677	15,867,699	17,668,834	15,949,359
Fare per passenger	1·21	1·15	1·16	1·18	1·18
Car mileage	1,548,902	1,546,389	1,644,712	1,754,811	1,449,647
Units per car-mile	2·15	2·06	2·20	2·22	2·11
Power cost per car-mile ...	2·677	2·786	2·749	2·630	2·556
Traffic receipts per car-mile	13·48d.	12·88d.	11·42d.	12·04d.	13·19d.
Expenses per car-mile ...	9·08d.	8·31d.	8·15d.	8·62d.	8·18d.
Ratio of expenses	67·04%	64·36%	67%	71·39%	61·85%
Number of cars in stock ...	67	67	67	67	57

British Thomson-Houston Company.—At the twenty-second ordinary general meeting of this company in London on July 30, Mr. H. C. Levis, chairman and managing director, presided, and in moving the adoption of the report and accounts for 1916, said that the total number of the company's employees who had joined His Majesty's forces was 1,309. The number who had fallen in the service of their country was 152. The number holding commissions was 102, many of whom had received decorations. The directors did not recommend the payment of dividends, as it had been deemed wise to use the surplus profits for further depreciation of the goodwill and plant accounts. Last year the goodwill account was depreciated by about £30,000, bringing it down to an even £100,000, and the plant account by £60,000. This year they were able to depreciate the goodwill by an additional £40,000, leaving the net amount £60,000. In regard to the plant, they expended during the year £88,535, but they had made a further depreciation for the year 1915 of £12,093, being an additional amount allowed by the Government, and for the year 1916 they had allocated £103,715, making the total writing off for the year nearly £116,000. Their holdings in shares and debentures of other companies were now valued very conservatively. The profit for the year of £359,304, after deducting all expenses and charges of every kind, excepting only interest, involved heavy payments to the Government, but they were glad that circumstances were such that their contribution could be so large. Last year they made a reserve of £25,000 to take care of possible depreciation in raw material; this year they wrote it back, and used it for other depreciations, because it was not required, and due to the fact that it was proposed under the Finance Bill that they should have two years within which to liquidate their stock of raw material, they felt there was little danger of making a loss in this connection. Their debentures had depreciated in volume by the amount drawn during the year. Their loan from the General Electric Company, of New York, had increased by £57,000, and the amount under sundry creditors, retentions, etc., was up £126,000, having increased from £300,684 to £426,910, but on the other side the item of apparatus finished and in process of manufacture had increased £124,000, sundry debtors, retention moneys, etc., had increased £135,000, and the cash balance had just doubled, increasing from £63,000 to £126,000. It would be interesting could he make a statement relative to the character of the work which they were carrying out, but it was impossible to say more than that practically their entire output was directly or indirectly for Government requirements. Mr. W. C. Lusk seconded the motion, and it was agreed to. Messrs. C. A. Coffin and E. W. Rice, the retiring directors, were re-elected.

Portsmouth Corporation Tramways.—The annual report of the general manager, Mr. W. R. Spaven, for the year ended March 31, 1917, shows that the total revenue for the year was £136,871, an average of 14·204d. per car-mile, as compared with £127,546, or 14·101d. per car-mile, in the previous year. After deducting working expenses, grants to dependants of employees serving with the forces, war bonuses, and adding interest on credit balances, there is a balance on working of £64,583, as compared with £66,218 for the preceding year. After payment of interest, income-tax, etc., there is a net balance of £18,680. The sum of £14,000 is transferred to the aid of the rates, £6,380 to the renewals fund, £1,381 to reserve and insurance fund, £188 to capital outlay, and £4,000 is reserved for the Cosham improvement. The traffic revenue is regarded as highly satisfactory, in view of the fact that the general holidays were not observed at Whitsun and August, and that during the winter months the services were much curtailed. A summary of the accounts for the past year and the four preceding years is appended:—

Year ended March 31.	1917.	1916.	1915.	1914.	1913.
	£	£	£	£	£
Total revenue	136,871	127,546	123,991	116,990	109,832
Working expenses	73,166	62,079	58,658	57,620	52,227
Profit on working	63,705	65,467	65,333	59,370	57,605
Interest on credit balances	878	751	780	829	765
	£64,583	£66,218	£66,113	£60,199	£58,370
	£	£	£	£	£
Interest	21,667	21,672	21,643	21,593	20,875
Sinking fund	18,061	18,055	18,455	18,263	17,462
Income-tax on profits ...	6,175	3,503	1,940	1,301	964
Allowance, renewals, 1902-9	—	1,211	—	—	—
	£45,903	£44,441	£42,038	£41,157	£39,301
	£	£	£	£	£
Net profit	18,680	21,777	24,075	19,042	19,069
Balance brought forward ...	7,278	9,569	10,702	11,374	8,067
Contribution to rates ...	14,000	13,000	10,000	5,000	4,000
Reserve and renewals ...	11,769	9,060	10,186	11,123	11,762
Contribution to capital ...	188	2,006	5,023	3,591	—
Balance carried forward ...	Nil	7,278	9,568	10,702	11,374
Passengers carried	31,788,562	29,348,918	27,554,194	26,266,342	24,520,647
Fare per passenger	1·018d.	1·033d.	1·061d.	1·052d.	1·052d.
Car-mileage	2,312,391	2,170,778	2,438,621	2,506,058	2,155,508
Units per car-mile	1·417	1·238	1·139	1·103	1·206
Power cost per car-mile ...	·911d.	·760d.	·549d.	·576d.	·582d.
Receipts per car-mile ...	14·204d.	14·101d.	12·201d.	11·204d.	12·229d.
Expenses per car-mile ...	7·017d.	6·556d.	5·599d.	5·518d.	5·815d.
Ratio of expenses	49·39	46·49	45·88	49·25	47·55
Total track mileage	34½	34½	34½	34½	30½
Number of cars in stock ...	100	100	100	100	100

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London United Tramways, Limited.—An adjourned meeting of the holders of the first mortgage debenture stock was held on July 26 to consider the report of the committee appointed on June 13 last. Mr. W. N. Mattinson, K.C., made a statement concerning the work done by the committee which had inquired into the financial circumstances of the company. He said he was not in a position to report fully as to all the causes of its present position, but the greatly increased cost of working due to the war was largely responsible for it. There were a number of questions relating to the physical state of the undertaking, the further capital expenditure required to maintain it, its relations with other undertakings, etc., which, in order to understand properly, required an intimate knowledge of tramway construction and working. The committee had asked for information on a number of specific points, and that had been given them; but the committee was of opinion that expert advice should be obtained without delay. The only course open to the committee by which they could hope at once to get first hand the information required was by electing to the board two gentlemen to be nominated by the debenture holders. The present board had, however, declined the committee's request, but they gave an assurance that they would give every information required by the committee, and they had also formulated in a somewhat more definite form their tentative proposals. The committee recommended that the bondholders should authorise them to incur all necessary expenses in obtaining professional and other advice. Mr. Mattinson moved a resolution to this effect, and this was seconded and agreed to.

DIVIDENDS.

Sao Paulo Tramway, Light and Power Company have declared a dividend of 2½ per cent. on the common stock.

Mather and Platt, Limited.—An interim dividend on the ordinary shares of 5 per cent. for the half-year, less income-tax, has been declared.

Hong Kong Tramway Company announces a dividend of 9 per cent., less tax (interim). Last year the corresponding dividend was 7 per cent.

Bristol Tramways and Carriage Company.—The directors have declared an interim dividend at the rate of 5 per cent. per annum for the past half-year.

City of Buenos Aires Tramways.—The directors of the City of Buenos Aires Tramways Company (1904) have declared a dividend of 1s. 3d. per share (being at the rate of 5 per cent. per annum), less tax, for the three months ended June 30.

Liverpool Overhead Railway.—The company announce a dividend for the past half-year at the rate of 2½ per cent. per annum on the ordinary shares. Similar distributions were made for the corresponding periods of each of the four preceding years.

London and Suburban Traction.—The directors of the London and Suburban Traction Company announce that they do not propose to pay an interim dividend on the preference shares for the half-year to June 30, 1917. Last year 2½ per cent. was paid.

London General Omnibus.—The directors of the London General Omnibus Company have declared an interim dividend for the half-year ended June 30 of 4 per cent., free of income-tax, on the ordinary shares. A year ago the interim dividend was at 5 per cent.

London Electric Railway.—The directors of the London Electric Railway Company have declared a dividend for the past half-year at the rate of 2 per cent. on the 4 per cent. preference stock, and ¾ per cent. on the ordinary shares. The rates are the same as a year ago.

City and South London.—The directors of the City and South London Railway Company have declared dividends of 2½ per cent. on the 5 per cent. preference stocks, 1891, 1896, 1901, and 1903, and ¾ per cent. on the ordinary stock for the six months ended June 30. The rate was the same a year ago.

Dublin United Tramways.—The directors propose to declare an interim dividend for the half-year ended June 30, 1917, at the rate of 6 per cent. per annum, less income-tax, on the preference shares, and at the rate of 4 per cent. per annum, less income-tax, on the ordinary shares. The dividend warrants will be sent out on August 4.

Metropolitan District Railway.—The directors of the Metropolitan District Railway Company have declared interim dividends for the six months ended June 30 on the 4 per cent. guaranteed stock of 2 per cent., on the first preference stock of 2¼ per cent., and on the second preference stock of 1½ per cent. The dividends are the same as a year ago.

Central London Railway.—The directors of the Central London Railway Company have declared interim dividends for the six months ended June 30 on the undivided ordinary stock of 1¼ per cent., and on the preferred ordinary stock of 2 per cent. There is no change in the dividend as compared with the corresponding half of the previous year.

Underground Electric Railways.—The directors of the Underground Electric Railways Company of London, Limited, announce that interest on the 6 per cent. first cumulative income debenture stock will be paid on September 1, less tax, at 3 per cent., and coupon No. 19 off the 6 per cent. income bonds will be paid, free of tax, at 2 per cent. For the second half of last year the rate was the same.

PERSONAL.

Mr. T. Potts has been appointed traffic manager of Doncaster Corporation Tramways.

Mr. A. S. Channon, electrical engineer of Grimsby, has been granted an additional war bonus of £50 per annum.

Mr. R. L. Horsfield, manager of Walsall Corporation Tramways, has been granted an increase of £100 a year in salary.

Mr. W. J. Best has been appointed staff engineer at Kelham Island power station, Sheffield, at a salary of £180 per annum.

Mr. S. T. Allen, electrical engineer of Wolverhampton Corporation, has been granted an increase in salary from £600 to £800 a year.

Mr. Robert Caven, manager of the Bessbrook and Newry Tramway Company, has retired on a pension after ten years' service.

Mr. J. W. Dawson, assistant electrical engineer of Bradford Corporation tramways, has been granted an increase in salary.

Mr. Martin Hamilton has been appointed manager of the Bessbrook and Newry Tramway Company, in succession to Mr. Robert Caven.

Mr. F. A. Fitzpayne, general manager of Leith Corporation Tramways, has received an increase of £100 in his salary, to be paid in two annual increments of £50.

Mr. Henry Mozley, general manager of Burnley Corporation Tramways, has been voted an increase in salary by the Tramways Committee from £450 to £525 per annum.

Mr. William M. Murphy, chairman of the Dublin United Tramways Company, accepted the invitation of the Government to act as one of their representatives at the Irish Convention, which was convened at Trinity College, Dublin, on July 26.

Mr. E. A. Prosser, general manager of the Cardiff Railway Company and of the Rhymney Railway Company, has been appointed also general manager of the Taff Vale Railway Company, and it is expected that the working of these lines will be unified.

Mr. T. B. Murray, a managing director of the Albion Motor Car Company, Limited, of Scotstoun, Glasgow, has received the degree of D.Sc. from Edinburgh University for his thesis, "Some Research and Inventions in Hydraulic, Electrical, and Motor Vehicle Engineering."

Mr. Bromley Holmes has been appointed chairman of a subcommittee specially appointed to deal with the supply of electrical energy to the Mersey Docks and Harbour Board. This committee will consider all questions of electric supply charges and extensions before they are submitted to the tramways and electric power and lighting committee.

Mr. Lorenzo W. Migotti, who for the past nine years has been electrical engineer to the Bahia Blanca North Western Railway and manager of the South American Light and Power Company, and who was formerly with the Underground Railways of London, has accepted the post of chief engineer to the Electric Supply Company of Rosario de Santa Fe, Argentine Republic.

Mr. G. F. Glass, on the recommendation of Mr. I. Bulfin, the general manager, has been appointed traffic superintendent of Bournemouth Corporation tramways, at a salary of £180 per annum, rising by annual increments of £20 to £220, in succession to Mr. R. O. Baldwin, who, as recently announced, has been appointed manager of Exeter Corporation Tramways. **Inspector Rushton** succeeds Mr. Glass as chief traffic clerk.

Mr. E. Hatton, general manager and engineer of Newcastle Corporation Tramways, who had been absent for some weeks owing to a severe illness, received a cordial welcome from the chairman of the Tramways Committee, Mr. Richard Mayne, at a meeting on July 6. Sir J. Baxter Ellis, alluding to the chairman's services, said that he deserved the thanks of the city for the able way he had managed the heavy traffic in race week in the absence of Mr. Hatton.

Mr. William Marsh, engineer and manager of Brighton Corporation Tramways, has been recommended by his committee for an increase of salary from £400 to £500 per annum. The peculiar condition is attached to the increase that the amount of it shall, during the time that Mr. Marsh is acting as an assistant director of shipyard labour, be reduced by an amount equivalent to the pecuniary benefit derived by him from the allowance for expenses to be made to him by the Government.

Mr. E. S. Rayner, who recently resigned his position as tramway manager and engineer of Doncaster Corporation to accept an important appointment in the Admiralty, has been presented with a gold wristlet watch in the presence of a large gathering of the officials and staff. Mr. G. A. Roberts made the presentation and expressed the cordial goodwill and best wishes of the staff. At a meeting of the Tramways Committee, the chairman, Councillor Balmforth, congratulated Mr. Rayner and wished him success in his new sphere of work.

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WITH THE FORCES.

Capt. P. H. di Marco, R.E., pre-war manager of the Barnsley and District Electric Tramway Company, Limited, after nearly three years at the front, during which he was twice wounded, is now in a military hospital in England.

Distinctions for Tramway Soldiers.—Major F. J. Chapple, power and rolling stock superintendent of the Potteries Electric Traction Company, who is serving in France with an artilley unit, has been awarded the D.S.O. Regimental Sergeant-Major H. Parker, Royal Dublin Fusiliers, and Corporal J. Cartlidge, former employees of the company, have been granted the Military Cross and the Military Medal respectively.

Tramway Employees Serving with H.M. Forces.—The Liverpool Tramways Department has been notified of the recent honours conferred for conspicuous bravery in the field on the following tramway employees now serving with H.M. Forces, viz. :—Military Medal: W. N. Fortune, E. Pritchard, J. E. Downes, T. J. Jones, and F. Shields, all serving with the Forces in France. Meritorious Service Medal: D. Collum, serving with the Mesopotamian Forces. Nine other employees of the department have received at different times distinctions for bravery in the field, viz. :—Capt. S. Carty, Military Cross and Medal; W. Broster, Military Medal and Distinguished Conduct Medal (killed in action); E. T. Pryce, J. H. Evans, and G. J. Lazell, Military Medal; R. Williams and A. R. Jones, Distinguished Conduct Medal; C. F. Claxton, D.C.M. and Military Medal; and T. Muncaster, Meritorious Service Medal. A large number of employees have also been mentioned by their respective commanding officers for conspicuous gallantry.

CONTRACTS AND ORDERS.

Derbyshire County Council propose to purchase six trailer wagons, the estimated cost being £650.

Messrs. Mossay and Company are to supply an electric vehicle to Dewsbury Town Council at £611.

Glover and Company, Limited, are the successful tenderers to Leicester Town Council for cables at £3,425.

Siemens Brothers and Company, Limited, are to supply a 1,000 K.W. rotary converter at £3,100 to Leicester Corporation.

Derby Corporation have accepted the tender of the British Thomson Company for a rotary converter and switch gear at £2,314.

The British Insulated and Helsby Cables, Limited, have an order from Derby Town Council for two miles of overhead wires.

British Westinghouse Electric and Manufacturing Company are to supply a 5,000-KW. generating set to Shoreditch Borough Council at £26,538.

The General Seating Company, Limited, have received an order from Derby Corporation Tramways for one hundred illuminated route number indicators.

The Shoreditch Electricity Committee have recommended the acceptance of the tender of the British Westinghouse Company, Limited, for turbo-alternator plant at £26,538. Nine tenders were received.

Glasgow Tramways Committee have accepted a tender from the Whitecross Company, Limited, Warrington, for the supply of span wire. The Electricity Committee have accepted the tender of Babcock and Wilcox, Limited, for additional coal-handling plant required at St. Andrew's Cross Station.

Walthamstow Council have accepted the following tenders :—Overhead line material, Fleming, Birkby and Goodall, Limited; trolley wire, Frederick Smith and Company, Limited; cable, W. T. Henley's Telegraph Works Company, Limited; switchgear, the British Thomson-Houston Company, Limited.

Headingley Tramways, Leeds.—The Corporation have accepted the following tenders for the reconstruction of the tramways in Victoria Road, Headingley, Leeds :—Section 1: J. Speight, tramway work, £508 2s. 6d.; highway work, £277 18s. 4d. Section 2: D. Speight and Sons, tramway work, £508 15s.; highway work, £277 18s. 4d.

The Newport Electricity Committee have accepted the following tenders for plant extensions :—British Westinghouse Electric and Manufacturing Company, Limited, electrical equipment for induced draught plant; Musgrave and Company, Limited, induced draught plant; Davenport Engineering Company, cooling towers; E. Green and Son, Limited, additions to fuel economiser.

London County Council Tramways.—The Highways Committee of the London County Council have accepted the following tenders :—Pinchin, Johnson and Company, Limited, baking and air-drying insulating varnish, £65; Jenson and Nicholson, Limited, finishing insulating varnish, £230; Dick, Kerr and Company, Limited, for the transfer, including dismantling and re-erection of two rotary converters, with transformers, from Greenwich generating station to Woolwich, £265; Heenan and Froude, Limited, patterns of tramcar trucks of the type principally used on the Council's tramways, £100; Alfred Clare and Company, a motor-driven taping machine for re-winding armature coils, £47 14s. 4d.; Edgar Allen and Company, Limited, 75 driving wheel centres for tramcars; Hadfields, Limited, 75 driving wheel centres for tramcars; William Beardmore and Company, Limited, 100 driving wheel axle forgings for tramcars, at £4 17s. 6d. each. The following orders in connection with Greenwich generating station have been placed :—Babcock and Wilcox, Limited, 8,000 stoker links for boilers at £277 15s., and 4,000 links for chain grate stokers at £133 17s. 6d.; P. and W. Maclellan, Limited, Glasgow, six top plates for repairing the ashpits, at £4 19s. 6d. each; W. and T. Avery, Limited, overhaul of two coal-weighing machines, £28 16s. 3d.

TRAMWAY AND LIGHT RAILWAY NOTES.

BARKING.

NEW LEASE OF TRAMWAYS TO ILFORD.

Representatives of the Ilford and Barking Councils have reached a provisional agreement for the renewing of the lease of the Barking tramway tracks. The period will be three years from June 1, 1917, and the annual rental will be £1,250. The price to be paid for energy supplied from the Barking Council will be 1 5/16d

BIRMINGHAM.

ROAD IMPROVEMENTS AND TRAMWAY EXTENSION.

Before next autumn a report will be presented to the Corporation by a joint committee of the Public Works, Tramways, and Town Planning Committees, recommending road widenings, tramway extensions, the construction of ring roads, and the linking up of main or arterial thoroughfares. The report will emphasise the need for concerted action, and apart from street widening on an extensive scale, the committee have prepared a plan which connects up one important street with another, and one district with another, with a view ultimately of establishing a much enlarged cross-city tramway system. The immediate sanction of the Council will be asked to a portion of the scheme relating to the acquisition of frontage sites on main arteries. Large numbers of leases are falling in, and the joint committee desire to acquire, as opportunities occur, plots of land, so that ultimately they may re-arrange the street lines with the object of giving a greater width of carriage-way.

CHESTER.

DIFFICULTY OF PERMANENT WAY MAINTENANCE.

Reports received from the city surveyor and the electrical engineer on the condition of the tramways track and overhead equipment at Chester have been ordered to be sent to each member of the Corporation, in order that the whole matter may be considered at a meeting of the Council in committee. The Sheriff, on obtaining the consent of the Corporation to this course, said that the reports were made to the Tramways Committee on November 25 and February 1 last, and the contents were so important that the committee considered the responsibility for taking action should rest with the Council. The matter was a source of danger to the city. Nothing could be done at present to remedy it, but the Council could consider what was to be the future policy of the Tramways Committee. Alderman J. Jones, chairman of the committee, said they were anxious to get the track restored, but it was an utter impossibility, and even after the war they would not be able for some time to make a thorough job of it. The committee were doing as much repairs as possible, and if anything further in that direction could be suggested they would adopt it.

DUBLIN.

GOVERNMENT TAKE OVER DUBLIN AND BLESSINGTON LINE.

The President of the Board of Trade, in taking over this undertaking, has decided that the financial situation for the ratepayers shall be as in 1913. In that year they were called on to pay in the County Dublin guaranteeing area a rate of from 3d. to 4d. in the £, and in the County Wicklow from 4d. to 6d. For the current year the ratepayers paid in the County Dublin area 2s. 4d., and in the County Wicklow 3s. 6d. in the £. Replying to a question by Mr. Clancy in the House of Commons, Mr. Roberts stated that the quantity of petrol used by the Dublin and Blessington Tramway Company had been reduced on June 1 from 1,100 to 734 gallons a month—a reduction of one-third, but as a result of representations the allowance had been increased to 890 gallons.

GREENOCK.

STAGE NUMBERING.

After a trial extending over some years, the Greenock and Port Glasgow Tramways management has abolished the system of indicating stopping places by numbers on the tickets. The system was confusing to strangers, and was never understood by local people. A reversion to the use of street names has been effected.

HALIFAX.

OVERTURNED CAR.

On July 15 a car of the Halifax Corporation Tramways was overturned, one passenger being killed and 37 injured. The car was running down Ambler Thorn Hill when it got out of the control of the driver and rushed to the bottom of the hill, a distance of 150 yards. On a curve there it jumped the rails, and after running about 25 yards over the setts was overturned. The driver was practically unhurt, but the conductress received injuries to the head. The car was a new one, and the cause of the accident is at present unknown.

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HUDDERSFIELD.

Track Doubling—New Cars—Rule of the Footpath.

At a meeting of the Tramways Committee on July 17, Mr. B. H. Wilkinson, the manager, reported on the advisability of doubling the track of the Bradley section, and he was instructed to apply to the Ministry of Munitions for authority to purchase the necessary material. The Corporation Tramways have recently received six new cars constructed for them by Messrs. Dick, Kerr and Company, Limited. The Watch Committee has decided in favour of the suggestions of the Tramways Committee as to the rule of the footpath. The question of motors and other vehicles passing stationary and other cars has been referred to the chief constable.

HULL.

Winter Clothing for Women Conductors.

The question of winter clothing for women conductors has been before the tramways committee. The manager stated that he had communicated with the women asking for their suggestions, and one depot had reported that they would like coats reaching to the knees, and that in place of skirts they preferred breeches fastened below the knees, with either leather leggings or puttees. "A very sensible suggestion," agreed a number of members.

KEIGHLEY.

Women Employees.

Mr. H. Webber, borough electrical engineer and tramways manager of Keighley, has stated that the employment of women as conductresses has been extended during the year, and they have replaced all men conductors. The change, which was forced on the undertaking by the war, has proved very successful. He believes this to be also the opinion of the majority of the passengers. An experiment with women as drivers was tried in the early part of last winter, and Mr. Webber thinks it would have been successful if tried in the summer months. As the military authorities are now pressing all tramway undertakings to instal women drivers, it is probable that the experiment will be repeated, but Mr. Webber remarks that it would be most undesirable to have no men drivers whatever. It would be necessary to keep men on the trackless vehicles and one or two on the central tramways to give the necessary stability to the traffic department.

LLANDUDNO.

Charges for Electricity Supply.

At a meeting of Llandudno Council on July 20, the Electricity Committee reported that, after considering the subject of power for traction purposes, they recommended the Council seriously to consider the question of giving the Llandudno and Colwyn Electric Railway Company formal notice to terminate the existing agreement, with a view to entering into a fresh arrangement on terms that will be more equitable, having regard to the increased cost of production. The Council have supplied the power for the operation of the electric railway between Llandudno and Colwyn Bay since that line was opened, under the agreement which the committee proposed should be terminated. The price paid ranges from a penny a unit according to consumption. By a majority the proposal was referred back to the committee for further consideration, as it was associated with general questions as to the financial position of the electric supply undertaking.

MANCHESTER.

Methods of Dishonest Passengers.

In a prosecution of a number of persons at Manchester for attempting to avoid payment of tramway fares and for riding in excess of the stages paid for, the Tramways Committee's solicitor stated that since the introduction of women conductors a practice seemed to be springing up of passengers keeping their fares in their hands without making any attempt to pay unless asked or an inspector boarded the car. Two of the defendants had travelled over four miles before inspectors discovered them without tickets. Fines of 20s. were inflicted in two cases and 10s. in others.

NEWCASTLE-ON-TYNE.

Employees' Demands—Coal Carriage by Sand Cars.

At a meeting of the Newcastle Corporation Tramways Committee on July 6, Mr. Richard Mayne, chairman, presiding, a deputation was received from the Tramway Workers' Union in support of an application for further bonuses for employees, both men and women. The following bonuses were asked for:—Female conductors, 3s.; male conductors under 21, 5s.; female car cleaners, both day and night workers, 3s. The committee decided to refer the demand to the Committee of Production in London, on the understanding that the judgment of the Government authorities should be accepted as final by both parties. The Tramways Committee have agreed to a scheme submitted by Mr. E. Hatton, the general manager, for utilising the tramway sand-cars during next winter for the purpose of distributing coal to householders.

NEWPORT.

New Cars for Tramway Extension.

At a recent meeting of the Town Council, Mr. J. Moxon, chairman of the Tramways and Electricity Committee, referring to the tramways extension, said that it was impossible to obtain new cars during the war. The London County Council had offered six top-covered double-deck cars with a seating capacity of sixty passengers, which were twelve years old, at £150 apiece, but unfortunately the cars could not pass under the bridges. It was stated that a new car of a similar type would to-day cost £1,200. The committee were given full powers to deal with the question.

PLYMOUTH.

Military Demands Entail Decrease in Service.

Ald. S. H. Phillips, chairman of the Tramways Committee, has informed the Council that demands were being made by the military authorities which, if persisted in, would result in a large decrease of the number of cars at work. The military were calling up the only man the manager had to work the lathe. If he was taken the work to a large extent broke down. They also asked for seven drivers. That meant four cars being taken off. If they could not retain these men they must reduce the service, and then they would have more complaints from the public. The manager's report for June showed that the cars carried 437,000 more passengers, and earned £315 more than in the corresponding period of last year At the same time they were obliged to leave a large number of passengers behind.

WALTHAMSTOW.

Success of Halfpenny Fare Abolition.

The Walthamstow Council Tramways were the first in Greater London to abolish halfpenny fares, and the success which followed the adoption of this course is noteworthy. The change first came into operation on April 3, 1916, so that the municipal year ended March 31 last covered practically twelve months' operation under the revised table of fares. The result shows an increase in revenue of £9,518; in average receipts per car-mile of 1·45d.; and a net balance after meeting all liabilities of £6,800, as against £918 for preceding year. This result should be encouraging to those other authorities in London which have more recently adopted a similar policy with regard to fares.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

Applications for Letters Patent.

Electric signalling devices (9,108)—J. Atherton.

Fluid pressure brakes (9,168)—British Thomson-Houston Company (*General Electric Company*).

Apparatus for automatically stopping or retarding locomotives (9,121)—H. Foulkes and C. McNeal.

Trolley wheels for tramcars (9,256)—W. J. Hunter.

India-rubber tires for road vehicles (9,363)—C. Macintosh & Company.

Carburetter control mechanism for motor vehicles engines (9,091)—Standard Motor Company and R. W. Maudslay.

Control mechanism for electrical fittings of motor vehicles (9,092)—Standard Motor Company and R. W. Maudslay.

Mechanically-propelled vehicles (9,463)—J. Newall and E. Williams.

Motor car propulsion (9,355)—A. Richards.

Lifting jacks (9,079)—W. Robins.

Electro-pneumatic brake system (9,165)—W. V. Turner.

Trolley heads of electric vehicles (9,146)—A. Wood.

Variable transmission mechanism for motor vehicles (9,735)—J. M. Armangué.

Attachment of rails to chairs and tie-bars and locking tie-bars in position (9,648)—H. Birkbeck (*Green*).

Means for securing railway rails in their chairs (9,679)—R. Bowen.

Automatic locking railway chair (9,767)—B. B. Roberts and J. Walters.

Change-speed gear of motor vehicles (9,792)—C. Stokes.

Brake gear of motor vehicles (9,793)—C. Stokes.

Continuous automatic fluid-pressure brakes (9,583)—J. C. Taite (*Bell*).

Lifting jacks for wheels of motor vehicles (9,770)—J. R. Watson.

Process and tool for the production of railway tires (10,070)—J. J. Baker, H. Brearley, and L. Jackson.

Self-acting brakes (9,951)—W. H. T. Beattie and R. C. Pessell.

Means for increasing leverage on brakes automatically (10,209)—G. S. Birtill and H. Mozley.

Tires and wheel rims for motor vehicles (9,874)—L. Brown and C. Macintosh and Company.

Lifting jacks (10,012)—M. Gilbey.

Railroads and tramways (10,120)—F. Palmer.

Railways, tramways, etc. (9,869)—P. F. Pogson.

Lifeguard for motor vehicles (10,143)—J. Stokes.

Fished joints of tramway and railway rails (10,231)—T. C. Way.

Transmission gear of motor vehicles (10,524)—W. Comery and the Raleigh Cycle Company.

Heavy traction attachment for motor vehicles (10,397)—H. Gibbs.

Device for guiding trolley pulley of electric car into contact with overhead wire (10,443)—E. B. Moyse.

Method of preventing tramcar trolley leaving overhead wires (10,389)—A. Richinson.

Traffic directing signals for road vehicles (10,315)—C. A. Singer.

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Specifications Published.

1914.

Drainage plant for road beds containing tramway tracks (8,144)—Imrie. (*Deutsche Asphalt-Akt.-Ges. der Limmer und Vorwohler Grubenfelder.*)

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.

Variable speed driving gear (7,699—*106,665*)—R. C. Sayer.
Power transmission mechanisms for motor vehicles (7,978—*106,687*)—T. A. Tisdell and New Hudson Cycle Company.
Apparatus for registering the coasting and stoppage time of electric vehicles (10,622—*101,290*)—W. O. Wade and C. C. Chappelle.
Means for preventing shocks by the axles of tramway and railway vehicles (10,669—*106,718*)—T. C. Winfield.
Railway ties and sleepers (11,926—*106,731*)—P. V. Troupe.
Demountable unit power plants for motor vehicles (12,642—*106,737*)—F. Mueller.
Automobile electrical apparatus for welding (13,805—*106,752*)—Tilling-Stevens, Limited, and P. F. Smith.
Ventilating and cooling generators and motors in electric vehicles (13,874—*106,754*)—Tilling-Stevens, Limited, and P. F. Smith.
Speed changing, reversing, and braking gearing (14,117—*106,757*)—G. Pollard and Menco-Elma Syndicate.
Back axle reduction gear for motor vehicles (17,686—*106,783*)—F. H. Royce and Rolls-Royce, Limited.
Automatic train signal and stop (3,530—*100,353*)—National Safety Appliance Company.
Method of treating rails, switches, points, crossings, etc. (14,110—*106,928*)—C. P. Sandberg.
Electro-pneumatic brakes for railway vehicles (18,374—*106,813*)—E. H. Dewson.
Indicating stations or stopping points on tramways (5,213—*107,024*)—C. W. Mallins.
Motor vehicles (8,895—*107,080*)—C. H. Crawley, M. E. Starkey, and W. E. Clarke.
Speed-changing mechanism of motor vehicles (10,189—*107,102*)—J. D. Dean, F. A. Howorth, and H. A. Jardine.
Back axles for motor vehicles (15,224—*107,149*)—Albion Motor Car Company and T. B. Murray.
Apparatus for the lighting and heating of motor road vehicles, trains, etc. (9,203—*107,260*)—W. F. W. Rhodes and J. Firth.
Direction indicators for motor vehicles (10,281—*107,279*)—H. S. Neville, W. E. Trinder, and H. G. Osborne.
Driving mechanism for motor vehicles (13,595—*107,313*)—C. H. Blomstrom.
Compound engines for motor vehicles (17,689—*107,339*)—W. T. Bell and L. W. Jones.

1917.

Means for converting a motor pleasure vehicle chassis into a commercial truck chassis (5,468—*105,762*)—W. F. Hudson.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1916. WEEKS ENDED.					1917. WEEKS ENDED.					AGGREGATE.		
	July 1.	July 8.	July 15.	July 22.	July 29.	June 30.	July 7.	July 14.	July 21.	July 28.	Wks.	1917.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Anglo-Argentine	46.726	51.679	54.578	49.729	46.346	49.639	50.782	52.007	48.949	46.664	30	1.535.461	+ 7.070
Calcutta ... ... Rs.	66.388	70.941	70.546	69.354	66.895	65.382	67.558	68.719	71.217	70.584	30	2.028.510	+ 20.182
Madras ... ... Rs.	29.250	(14 days) 34.007		(14 days) ...		32.492	(14 days) 36.083		(14 days) ...		28	444.499	+ 40.150
Pernambuco	2.821	3.104	4.066	2.998	2.917	3.694	4.201	4.086	4.003	3.892	30	110.937	+ 21.829

Companies Issuing Monthly Statements.

	1916. Feb.	March.	April.	May.	June.	July.	1917. Feb.	March.	April.	May.	June.	July.	Wks.	AGGREGATE. 1916-17.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	3.512	3.881	3.727	3.854	...	...	3.196	3.422	4.611	2.991	...	...	8	7.602	+ 21
Brazilian Traction Mlrs	6276000	6913000	6882000	7304000	7178000	...	6872000	7549000	7453000	7864000	7642000	...	26	44.646.000	+ 3.467.000
Brisbane	30.320	34.275	32.575	33.150	31.390	32.880	29.800	33.340	31.620	33.340	32.475	32.720	30	226.315	− 915
British Columbia	$572.935	446.401	421.265	414.215	400.814	...	581.555	456.626	447.429	438.919	373.029	...	52	5.325.756	+ 262.642
Buenos Ayres Lacroze	39.137	42.219	40.220	40.220	36.213	38,439	35.977	41.337	39.111	40.595	38.020	38,063	4	38.063	− 376
Burma	20,345	22.958	22.191	23 585	24.027	...	22.912	27.132	23.660	24.906	25.463	...	48	282.879	+ 29.134
Cape Town	...	14.994	...	...	...	...	16.229	17.688	16.705	15.867	...	...	21	84.829	...
Carthagena & Herrerias	1.585	2.991	2.513	2.927	3.512	2.371	3.223	2.955	4.366	4.321	5.325	5.763	30	29.935	+ 11.195
Cordoba	11.831	13.598	...	14.869	...	...	11.898	13.098	...	13.735	...	...	9	27.395	− 1.546
East India	1.863	2.196	2.116	2.161	2.283	2,220	1.570	1.647	1.445	1.455	1.186	1,183	52	21.509	− 3.861
Kalgoorlie	2.248	2.479	2.553	...	...	...	2.193	2.772	2.705	...	...	...	17	10.101	+ 585
La Plata	4.345	4.611	4.354	4.342	3.735	3.910	4.092	4.527	4.229	4.126	3.852	3.875	30	29.019	− 816
Lima	...	34.169	33.542	33.966	...	...	...	37.569	37.807	35.321	...	...	21	181.809	+ 13.098
Manaos ... Rs.	...	...	155.030	152.854	144.913	152.380	144.532	161.156	160.545	159,613	...	...		...	...
Manila ... ... $	66.303	...	...	53.900	...	...	73.200	...	...	61.500	...	...		...	...
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...		...	...
Monte Video	32.502	31.956	28.997	28.349	25.300	...	32.304	31.979	29.230	28.716	27.458	...	35	242.796	− 1.728
Peruvian ...	$775.700	...	...	826.900	929.500	835,430	844.770	...	...	902.780	965.420	975,000	4	975.000	+ 139.570
Port Elizabeth ...	3,857	...	...	...	...	...	3,553	4.428	3,904	3.494	...	...	21	19.877	...
Rangoon	4.674	5.501	4.849	4.589	4.205	4,357	4.605	6.226	5.036	4.737	4.383	4,783	30	34.403	+ 1.465
Toronto ...	$846.256	910.969	883.209	903.924	884.491	...	932.567	...	970.367	992.460	984.529	...	26	5.873.584	+ 538.385
Winnipeg ...	$293.250	296.500	282.498	276.980	254.686	...	280.717	293.094	265.594	259.794	254.226	...	26	1.673.370	− 28.104

(Continued on page 116)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1916. WEEKS ENDED.				1917. WEEKS ENDED.						AGGREGATE.		
	July 1.	July 8.	July 15.	July 22.	July 29.	June 30.	July 7.	July 14.	July 21.	July 28.	Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£			£	£
Aberdare U.D. Council	353	364	384	389	410	394	415	462	450	484	16	7.044	+ 722
Aberdeen Corporation	1.834	1.908	1.841	1.865	2.267	2.230	2.293	2.144	2.535	2.319	8	17.967	+ 2.772
Accrington Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Ayr Corporation	385	470	503	745	710	524	595	724	1.382	823	11	6.394	+ 1.327
Bath Electric	*	...	...	...	...	...	...	...	...	...	—	—	—
Belfast City	5.804	5.580	5.624	5.482	5.941	6.429	6.558	7.183	5.784	6.173	17	104.136	+ 8.794
Birkenhead Corporation	1.567	1.612	1.531	1.621	1.673	1.903	1.955	1.909	1.930	1.955	17½	30.548	— 4.217
Birmingham Corporation	16.322	16.262	16.617	16.521	17.152	17.511	18.863	18.033	18.176	18.840	17	302.373	+ 20.865
Birmingham Corp. Motor Omnibuses	970	975	1.028	1.050	1.173	896	1.053	1.001	990	1.069	17	15.540	+ 887
Blackburn Corporation	1.263	1.207	1.194	1.300	1.649	1.364	1.618	1.592	1.656	1.676	17½	26.144	+ 3.599
Blackpool and Fleetwood	892	1.583	1.233	1.526	1.822	986	1.773	1.559	1.487	1.692	29	19.361	+ 226
Blackpool Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Bolton Corporation	2.917	2.914	2.788	3.095	3.083	3.377	4.065	3.363	3.423	3.391	17	56.558	+ 6.036
Bournemouth Corporation	2.304	2.179	2.411	2.516	2.775	2.403	2.479	2.612	2.863	2.620	17½	41.510	+ 1.045
Bradford Corporation	6.551	6.859	6.657	7.060	7.679	7.817	8.098	7.995	8.067	8.256	17	129.978	+ 12.322
Brighton Corporation	1.236	1.328	1.273	1.451	1.542	1.419	1.528	1.657	1.714	1.787	17½	24.183	+ 3.298
Bristol	4.916	5.076	5.181	5.182	5.574	5.472	6.118	5.650	5.999	6.172	29	155.146	+ 12.416
Burnley Corporation	1.601	1.665	1.586	1.626	1.798	1.796	1.981	1.714	250	1.285	—	—	—
Burton-on-Trent Corporation	270	286	266	285	291	298	306	306	374	322	17	4.978	— 401
Bury Corporation	1.344	1.505	1.383	1.581	1.555	1.698	1.982	1.697	1.765	1.763	17½	28.733	+ 3.208
Cardiff Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Chatham and District	1.317	1.341	1.343	1.336	1.396	1.396	1.416	1.370	1.518	1.547	30	37.472	+ 2.525
Chesterfield Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Colne Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Cork Electric	567	581	542	589	619	634	671	637	647	680	30	15.744	+ 997
Croydon Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Derby Corporation	1.114	1.119	1.138	1.162	1.255	1.168	1.226	1.218	1.258	1.290	17	19.957	+ 469
Dover Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Dublin and Lucan	*	...	...	...	...	...	...	...	...	...	—	—	—
Dublin United	7.274	6.464	6.629	7.034	7.629	7.528	8.130	7.207	7.547	7.723	30	194.584	+ 22.120
Dundee City	1.378	1.359	1.340	1.409	1.480	1.530	1.557	1.529	1.658	1.837	10½	15.963	+ 1.762
East Ham Corporation	1.388	1.398	1.349	1.337	1.399	1.422	1.452	1.340	1.436	1.490	17	24.318	+ 1.723
Exeter Corporation	389	405	403	438	466	392	435	435	450	464	17	6.703	+ 69
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	23.065	22.157	22.493	22.251	23.153	27.448	27.144	26.831	21.692	24.041	8½	218.728	+ 26.190
Glossop (Urban Elec. Supply Co.)	134	139	136	144	161	152	172	169	168	174	30	4.300	+ 256
Halifax Corporation	2.234	2.275	2.226	2.180	2.630	2.455	2.689	2.662	2.640	2.669	16½	40.365	— 2.941
Halifax Corp. Motor Omnibuses	50	49	48	47	55	43	47	46	51	54	16½	728	— 62
Hastings and District	1.042	1.131	1.166	1.266	1.321	1.324	1.352	1.487	1.516	1.599	30	32.884	— 5.641
Huddersfield Corporation	2.833	2.974	2.893	2.963	3.380	3.223	3.536	3.399	3.330	3.609	17	55.528	+ 4.759
Hull Corporation	3.184	3.234	3.279	3.288	3.238	3.319	3.460	3.402	3.512	3.607	17	56.806	— 3.037
Ilford U.D. Council	746	718	713	723	741	775	809	752	797	837	17	12.948	+ 1.073
Ilkeston Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Ipswich Corporation	625	677	621	554	567	698	731	682	779	851	17	11.049	+ 1.695
Isle of Thanet	384	446	453	525	573	386	377	363	376	422	43	12.242	— 609
Kilmarnock Corporation	169	176	167	187	228	183	215	196	227	246	10½	2.076	+ 185
Lanarkshire	2.372	2.371	2.255	2.478	2.675	2.929	3.139	2.902	3.908	3.096	30	79.915	+ 12.795
Lancashire United	1.851	2.054	1.844	1.810	2.163	2.316	3.331	3.170	2.512	2.765	30	64.897	+ 12.879
Leeds City	9.764	10.074	10.006	10.110	10.905	10.958	11.835	11.506	11.256	11.763	17	187.223	+ 20.366
Leicester Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Leith Corporation	850	852	913	951	1.043	1.070	1.102	1.125	1.299	1.318	10½	11.734	+ 2.304
Leyton U.D. Council	1.753	1.738	1.762	1.706	1.828	1.816	1.934	1.848	1.934	2.000	17	32.435	+ 4.058
Liverpool Corporation	14.478	14.866	14.690	14.643	15.665	16.122	17.375	17.143	16.589	17.251	29½	451.516	+ 38.744
Llandudno and Colwyn Bay	427	448	492	554	580	401	433	475	524	561	34½	9.239	— 699
London County Council	49.001	49.616	49.514	48.584	50.556	55.162	56.630	55.088	56.543	58.169	16½	904.954	— 105.663
London General Omnibus	*	...	...	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Maidstone Corporation	210	246	222	214	226	239	272	251	263	264	17	4.039	+ 354
Manchester Corporation	20.674	19.320	19.055	19.355	20.411	19.280	20.234	20.845	20.510	21.308	17	346.680	+ 23.476
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	...	...	200	230	257	...	...	271	219	289	17	3.990	— 246
Newcastle-on-Tyne Corporation	6.753	6.992	7.129	7.125	7.370	8.158	7.644	7.738	8.005	8.216	17	130.379	+ 19.159
Newport (Mon.) Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
New St. Helens and District	1.039	1.081	1.083	1.030	1.289	1.330	2.017	1.778	1.506	1.474	4	5.875	+ 1.772
Northampton Corporation	701	716	695	691	738	805	834	819	852	861	17	13.535	— 1.663
Nottingham Corporation	3.907	3.852	3.993	3.888	4.150	4.197	4.500	4.485	4.483	4.631	17	71.662	+ 6.401
Oldham Corporation	2.400	2.460	2.462	2.806	2.702	2.895	2.922	2.955	3.038	2.888	18	50.970	— 4.861
Portsmouth Corporation	2.754	3.042	2.886	3.019	3.319	2.925	3.429	3.195	3.285	3.530	—	—	—
Preston Corporation	1.042	1.091	1.126	1.029	1.132	1.166	1.215	1.194	1.196	1.256	16½	19.524	+ 1.307
Provincial	2.464	2.684	2.633	2.698	2.913	2.483	2.808	2.757	2.765	3.050	43	94.804	+ 558
Reading Corporation	836	847	875	844	903	987	1.064	1.033	1.076	1.108	16½	16.752	+ 2.822
Rhondda Tramways	1.294	1.304	1.351	1.338	1.424	1.501	1.624	1.539	1.564	1.608	30	43.037	+ 6.129
Rochdale Corporation	1.647	1.811	1.785	1.915	2.085	2.035	2.338	2.251	2.193	2.292	17	35.909	+ 4.209
Rotherham Corporation	1.571	1.582	1.548	1.647	1.660	1.774	1.802	1.826	1.858	1.764	17½	30.772	+ 4.768
Salford Corporation	5.654	5.759	5.468	6.140	5.973	6.983	7.038	6.637	6.954	6.589	17½	113.008	+ 16.398
Sheffield Corporation	10.742	10.828	10.679	10.990	10.992	11.861	12.211	12.161	12.505	12.150	18	211.427	+ 23.323
Southampton Corporation	1.679	1.716	1.657	1.710	1.838	1.976	2.049	2.079	2.101	2.179	16½	31.995	+ 4.947
Southend-on-Sea Corporation	895	960	1.010	1.019	1.155	984	1.057	1.012	1.111	1.213	17	15.787	+ 1.417
South Metropolitan Tramways	*	...	...	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	810	849	896	905	992	1.172	951	964	985	1.060	17	15.982	+ 2.095
Sunderland Corporation	1.614	1.645	1.708	1.834	1.995	1.914	1.783	1.818	1.939	2.033	17	30.443	+ 2.527
Sunderland District	629	592	601	647	780	800	809	737	772	942	39	26.586	+ 3.680
Swindon Corporation	198	193	...	...	...	258	271	...	...	...	—	—	—
Torquay Tramways	593	623	594	690	760	671	704	736	715	802	30	15.726	+ 1.390
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	667	629	633	702	846	1.035	1.145	1.233	1.005	1.077	4	3.585	+ 872
Wallasey Corporation	1.388	1.471	1.438	1.539	1.779	1.587	1.829	1.932	1.839	2.059	17½	26.663	+ 2.917
Walsall Corporation	827	827	824	834	859	911	976	947	973	984	16	15.926	+ 1.612
Walthamstow U.D. Council	1.120	1.158	1.148	1.146	1.274	1.220	1.354	1.229	1.284	1.421	17	21.515	+ 2.945
Warrington Corporation	491	497	495	476	516	...	...	538	526	552	17	8.726	+ 686
West Ham Corporation	3.304	3.322	3.346	3.259	3.386	3.647	3.732	3.676	3.733	3.792	16½	62.090	+ 6.809
Wigan Corporation	...	...	1.669	1.677	1.769	...	...	2.034	1.963	2.043	17	32.376	+ 3.984
Wolverhampton Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Yorkshire (West Riding)	1.870	1.783	1.710	1.831	1.980	2.141	2.326	2.196	2.250	2.332	30	60.764	+ 9.639

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

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Averages Tell Results

Sheffield Corporation's Records of Mileage and Maintenance

THERE is nothing so certain or so deadly in the world of business and commercial endeavour as the law of average. For instance, the life of any one particular person is the most problematical thing in the world: the life of half-a-million is the one safe estimate upon which insurance can be based.

SO when it comes to commercial motors the performance of any one particular vehicle may be totally unreliable—the performance of a dozen or twenty is evidence which will bear sifting and pay for studying. 10,000 miles may be regarded as only a promise; 500,000 miles is a performance.

HERE are the figures for the past four years of the Sheffield Corporation Omnibus Service. A fleet of 21 Daimler Vehicles is now employed.

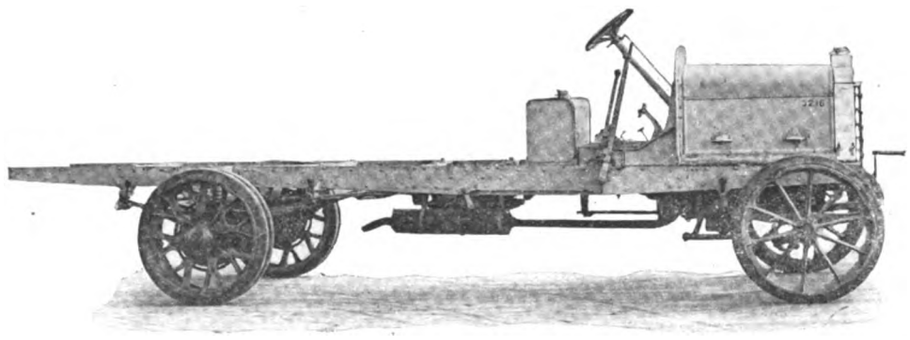
Per Bus Mile.

Year ending 25th March.	Mileage Run.	Average Cost.	Average Revenue.	Repairs and Maintenance.
1914	214,775	6·67d.	10·20d.	1·22d.
1915	369,404	7·03d.	10·47d.	1·91d.
1916	540,628	8·48d.	12·06d.	2·87d.
1917	620,196	9·84d.	13·31d.	3·27d.

IF you are a user of Commercial Motor Vehicles you cannot afford to neglect the law of average. It calls for reliable, adequate, and immediate records of your vehicles' performances. The Daimler Record System is at the Service of all users and prospective users; by its adoption all the information you require can be formulated, and comparisons will prove that

THE DAIMLER WAY IS THE SURE & CERTAIN WAY TO PROFITS

The Daimler Company, Ltd., Coventry



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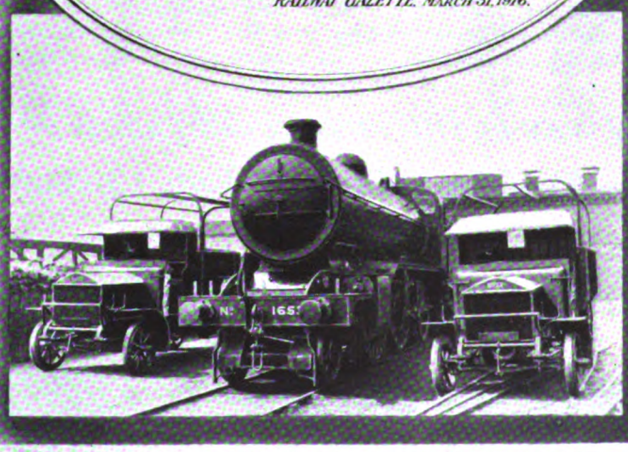
"The Design and Construction are Throughout of a Character, which it would be Exceedingly Difficult, if not Impossible, to Improve Upon."

RAILWAY GAZETTE, MARCH 31, 1916.

IN PEACE

USED BY THE LARGEST CARRYING COMPANIES AND COMMERCIAL HOUSES.



IN WAR

USED BY THE BRITISH AND ALLIED GOVERNMENTS.

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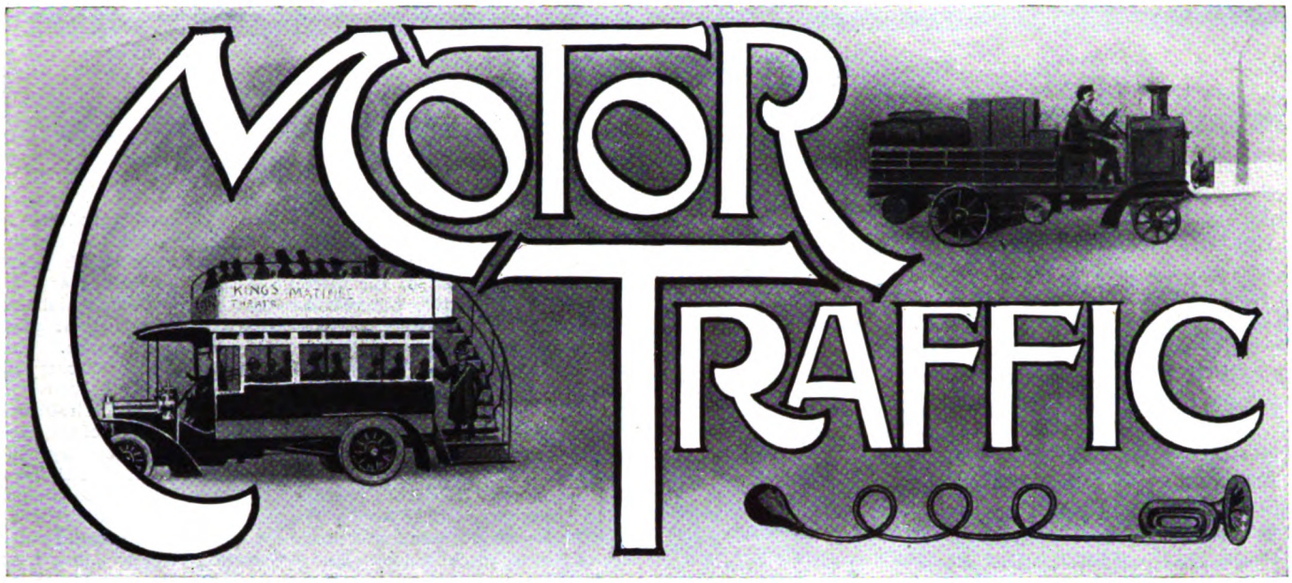

Whatever may be the need for drivers of trade vehicles, it is evident that experienced motor users do not consider it safe to reduce the age at which a licence for driving a public service vehicle can be granted. This is no doubt a wise precaution, but it might be qualified to some slight extent. If the minimum age limit for the drivers of motor vans were reduced by a year, it might not prove unsatisfactory to reduce the age limit for drivers of public service vehicles by six months, and to grant the licence only to applicants who can show a record of at least six months' satisfactory handling of a van or lorry. It is, of course, more important to ensure a proper degree of responsibility on the part of a driver if he is directly in charge of the lives of others. At the same time, the safety of all forms of traffic is interdependent. If goods vehicles are handled by youths of a reckless or irresponsible disposition, they are almost as likely to cause accidents to motor omnibuses as to themselves. No driver, however good, is safe while passing through traffic incompetently handled.

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On the general question of the suitability of youthful drivers there is at least one argument which ought to be placed on the credit side. A boy of sixteen or seventeen years of age may be disposed to take risks, but he may at least be expected to have strong nerves and a very high degree of confidence in himself. The quality that is needed to avoid an accident in face of some sudden emergency is that of rapid decision not interfered with by nerve failure or hesitation due to any cause. The boy may take his risk and justify himself by results, while the older man, having, through the same lack of experience, got himself into the same tight corner, may, by having a clearer realisation of his danger, render himself all the more incompetent to deal with it. If it came to the question of employing either a boy of sixteen or a man who, let us say, has been invalided out of the army owing to nerve failure or shell shock, we should probably be better advised to trust ourselves to the former. Under present regulations, however, he would be refused a licence, which would be freely granted to the older man.

The decision of the Local Government Board to relax for the time being the regulations as regards the shape of the steel tires of tractors used upon the road is avowedly only an emergency provision. The idea is to make it possible to employ upon the road agricultural motor tractors, the wheels of which are fitted with strakes not in exact accordance with the former law, but not such as to do any very serious damage to the roads, assuming the tractor weight and also the weight hauled to be moderate. It is questionable whether this temporary relaxation is really necessary in the interests of the efficiency of farm tractors. Hitherto British manufacturers of these machines have been obliged to adhere to the letter of the law. Even if a tractor is not used for road haulage, it must at times travel upon the road to go to its work. The regulation strakes on driving wheels have been found satisfactory enough for the purpose of getting a grip on hard, dry land, but when the surface of the land is greasy, spuds or spikes must of necessity be fitted, and these, if they are to be effective in the fields, must be altogether outside the pale when the machine is on the road. Just at present, of course, we are obliged to make up the deficiency in our own agricultural machinery by importing freely. The tractors brought over from America have not had their wheels designed to comply with our laws, and if it were necessary to fit new wheels before using them, serious delays would be caused, and the number of machines that could be made available for service would be greatly reduced. Thus, the temporary privilege conferred by the Local Government Board Order is temporarily essential. It is to be hoped, however, that we shall go back to the old rules as regards the strakes on wheels at the first opportunity. Permanent change in the regulations affecting the steering wheels of farm tractors would be more welcome. These, to get a grip on soft land, are generally fitted with what amounts to a narrow projecting ring round the centre of the circumference of the tire. This really makes the wheel illegal for road use, but provided that the weight upon the wheel is only small, it would seem possible to offer a permanent concession in respect of machines that have been constructed primarily for work in the fields. In these matters we have to consider the interests of the general public and of the road authorities as well as those of the motor owner, and it is therefore unwise and unreasonable to ask too much. We may suggest, however, that this small concession would do nobody any harm.

* * * * * *

Whatever may be done in the matter of rendering legal various forms of wheel particularly desirable on field tractors, we must all the while bear in mind that no machine deserves much consideration, unless the diameter of the wheels fitted is decidedly generous. The big wheel is better for the road and better for the

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MOTOR TRAFFIC.

mechanism. It is also better on the land. It may cost a little more, but it is well worth it. We cannot make up for lack of diameter by increasing the width of the tire. This may prevent the wheel from sinking in too far on soft ground, but is of very little effect on a hard road of pronounced camber. Moreover, on all surfaces the small wheel is wasteful of power, because the temporary or permanent depression which it forms beneath it has steep sides up which the power of the machine must push the wheel. The depression made by a large wheel, on the other hand, has quite a gentle declivity. If we could make a wheel of infinite diameter it would get so big a bearing surface that it would not sink in at all, and though this is impossible we can approximate to the ideal by replacing the wheel by a chain track, which forms in effect a small segment of a very large wheel, and allows of heavy weights being carried without appreciable compression of the soil or road. This matter of large wheels is one that has been discussed from time to time for many years. It is again brought into prominence by the arrival of the agricultural tractor, and the need of protecting the roads from the damage that might result from the free use of machines of any design that the farmer happens to fancy. We need have no hesitation in our advocacy, for the simple reason that what is good for the road is as a matter of fact good for the motor user, and if he will not select it of his own free will, there is every reason for forcing it upon him.

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Before the war the military authorities were criticised for stipulating that vehicles of subvention model should have wheels of unusually large diameter. It was urged that the result was to raise the platform so high as to be inconvenient for loading. If so, the existing loading facilities must be altered rather than that we should go back to the small wheel on the lorry. Steam vehicles, having been less used for military purposes, are sometimes rather bad offenders in the matter of small wheels, and it is noticeable that many of the electric vans and lorries which have been helped into prominence partly by their real merits and partly by the shortage of petrol, err on the small side. Incidentally, these vehicles are rather heavy, owing to the necessity for carrying weighty batteries, so that in their case a fault of this kind is all the more objectionable. The Commissioner of Police, in urging that the weight of London omnibuses should be still further reduced, is endeavouring to consult the interests of the public and of those who live along omnibus routes. He would probably be better advised if he were to stipulate larger wheels and make a small additional allowance in respect of weight to cover the increased weight of the big wheels and correspondingly big tires. It is not weight in itself which is responsible for vibration and road damage, but rather the comparative inadequacy of the means provided for carrying that weight.

MOTORISTS' WORK AFTER THE WAR.—At the annual meeting of the Automobile Association and Motor Union, the chairman (Mr. W. Joynson Hicks, M.P.) said that a great deal of work would have to be done after the war. The most important work would be in connection with the restoration and repair of British roads. In comparison with pre-war periods the road materials used for repairs in one county alone were now reduced to less than one-half, and he urged that it was essential that the roads should not only be restored, but greatly improved, after the war was ended. They must also assist in the revival of the manufacture of motor vehicles. After the war there would be new motor engines and cars far more wonderful than those in use before the war.

COAL GAS AS A MOTOR FUEL.

While confirming our own opinion that coal gas cannot fail to prove a useful substitute in emergency for petrol in connection with certain services, the vehicles employed upon which adapt themselves fairly well to the carriage of large gas containers, the report of the executive committee of the British Commercial Gas Association just published does not give the impression of great optimism as to the future of coal gas fuel viewed as a whole. This future obviously depends very much on the possibility of carrying fuel in some more compressed form than that in which it is at present employed. The Gas Association do not consider it desirable to attempt to use the highest possible pressures, on account of the high cost of compression, the subsequent supervision necessary, the depreciation of the containers, and the loss of efficiency of the gas. They recommend moderate pressures of about 300 to 400 lb. per square inch, or, say, 20 to 25 atmospheres. Compression at 25 atmospheres would reduce the space occupied by a thousand cubic feet of gas to 40 cubic feet. The Association considers that from 250 to 300 cubic feet of gas gives an equivalent mileage to one gallon of petrol, though it should be mentioned incidentally that the results of experience seem to show that the actual engine power developed is about 15 per cent. lower with coal gas than with petrol. Taking 250 cubic feet as the equivalent of a gallon, the containers necessary to carry the equivalent of four gallons would therefore have to have a total capacity of 40 cubic feet. They would, in fact, be large, unwieldy, and heavy. It is pointed out that the whole supply need not be carried in one container, but the various vessels could be connected by solid drawn copper tube weighing only about 4½ lb. per 10 ft. run. A table of figures is given showing the weights of existing containers. From this it appears that for a pressure of 25 atmospheres a container with a volume of 20 cubic feet weighs rather over 750 lb. Two such containers would therefore weigh approximately 14 cwt. It is suggested that the recent discovery of steels of immense tensile strength will permit of some considerable reduction of weight, amounting possibly to 50 per cent. Even so, to take an example, a 30 cwt. van carrying enough fuel for a run of about 50 miles would apparently have its useful load capacity reduced to about 23 cwt. In some services this would not matter very much; in others it would be a vital disadvantage. In any case, the carriage of so much dead weight would increase the cost of operation, and largely neutralise the saving in fuel cost.

As regards this last point, we may perhaps assume that after the war the average price of gas will be approximately 2s. 6d. per thousand cubic feet. This would mean that this type of fuel would be available under the present system, in which it is stored approximately at atmospheric pressure, at a cost corresponding to 7½d. per gallon of petrol. It is admitted that if compressed gas had to be supplied, the cost would be higher. We should have to take into account the considerable first cost of the reservoirs. Also, the cost of the compressing machinery and the expense involved by utilising power to operate that machinery. Probably the compressed gas would be not less than double as expensive as the same quantity of gas at atmospheric pressure. On this assumption it would correspond to petrol or benzol at about 1s. 3d. a gallon, with the additional handicap of materially reducing the useful load capacity of the vehicle, and involving constant expenditure under various headings in the carriage of useless load. For instance, part of what we might save on fuel would be lost in additional tire wear. On the whole, then, it does not appear that the possibilities of using compressed gas are particularly promising.

The other system, which is already in employment, is obviously not universally applicable, owing to the immense size of the containers necessary as well as their fragile nature. These containers have the advantage of being fairly cheap and not very weighty. Consequently it is at least possible that certain regular local services carried on by vehicles of the single-decked omnibus type may continue to use coal gas fuel permanently. In other spheres there may be a limited humber of instances of its regular use, but these will be almost certainly much in the minority. In fine, the report seems to indicate once and for all that while coal gas fuel may be a great blessing to many people at the moment, it cannot be regarded as in any sense a generally applicable alternative to the liquid fuels with which we are familiar.

It seemed possible recently that the use of coal gas even as an emergency measure might be prevented by restriction in supplies. It now appears, however, that the Ministry of Munitions urgently needs in connection with the manufacture of explosives various materials, the creation of which involves at the same time the production of coal gas. Consequently it does not seem probable that supplies will for the present be limited or prices seriously increased.

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MOTOR TRAFFIC.

FITTING THE VEHICLE TO THE ROAD.

SOME OBSERVATIONS UPON THE RESTRICTION AND DEVELOPMENT OF VEHICULAR TRAFFIC.

The latter-day development of highway traffic in England, consequent upon the introduction of mechanical traction, has brought about a revival of the old controversy of whether the road should be adapted to the vehicle or the vehicle be adapted to the road. The innumerable public bodies responsible for the control of highways and vehicles in this country may be classified in two sections, one of which advocates the highways being improved sufficiently to enable them to withstand all reasonable exigencies of traffic, while the other believes in restricting the development of vehicles to the standard of the more or less defective roads over which they pass. The latter policy, as will be demonstrated, has been reflected largely throughout our highways legislation, with lamentable results.

The speedier and easier the means of locomotion and transport, the more readily can the industrial and commercial resources of a country be developed. The Romans and other nations of antiquity made the proper maintenance of highways one of the first considerations of the State, and their roads were improved commensurately with the development of traffic over them. Vehicles of all descriptions such as the skill and ingenuity of the time could devise were allowed unrestricted use of the roads; new forms of locomotion were encouraged, and the volume of traffic on the highways was the measure of a country's prosperity. Since the passing of the Romans from England our roads, which have been compared with the veins and arteries of a living organism, have never been under a comprehensive and efficient control. Neither have the regulations for vehicles been vested in one responsible authority. After centuries of neglect, when at last attention was directed to our highways and the traffic passing over them, a confusion of interests retarded effective legislation. To-day, despite the lessons of the past, progress in highway locomotion is restricted by similar influences.

HOW BAD ROADS CRIPPLED TRADE.

During the Middle Ages the inland trade of England was crippled by the defective condition of the highways. Wheeled carriages for the conveyance of merchandise and general produce could be utilised only to a limited degree, and such as were in use were necessarily heavy and cumbersome to enable them to withstand the roughness of the ways—the vehicle had to be fitted to the road. The pack-horse was the chief means of transport, and the load which a horse can carry being considerably less than that which it can haul, the cost of carriage was an important consideration to the trader. As a consequence, it was cheaper in many instances to import commodities from abroad than to obtain them from distant parts of our own country. Ships could make the voyage to the ports of France or the Low Countries and return with heavy cargoes of the goods of the foreigner in less time than it took for the string of straggling pack-horses to journey to an inland town sixty miles distant from the metropolis. The pack-horses survived until the seventeenth century—striking testimony to the condition of the highways of mediæval England. Shakespeare has interpolated into "Henry V.," the description of the Rochester carriers and their pack-horses, which is an excellent delineation of inland transport in the time of Queen Elizabeth.

PREJUDICE AGAINST VEHICLES.

Travelling was equally defective in the Middle Ages in England. Carts had been used by the Danes and the Anglo-Saxons for travel as well as for the transport of goods. Some of the roads made by the Romans were at that period probably in fair condition, and permitted of such vehicular traffic, the development of which received a serious set-back on the coming of the Normans. Great though the Normans were as builders and administrators, they appear to have given no attention to the improvement of either the roads or the vehicles using them. Indeed, in the latter connection, the Normans' ideas of chivalry impelled them to regard wheeled vehicles for travelling as effeminate innovations unworthy of notice. To them the horse-litter, for ladies of high rank, was the sole "carriage" needed. To the deliberate refusal to recognise the advantages of wheeled traffic may be ascribed the ruinous condition of the English highways in after centuries, for the roads—deteriorated into little more than trackways for horses and mules—were utterly incapable of accommodating wheeled carriages when at last the deep-rooted dislike to the latter abated. Thus prejudice against vehicles in the past was responsible not only for preventing progress in locomotion, but also for reducing the highways to a standard of inferiority analogous to the traffic using them—the road became as crude as the carriage.

EARLY HIGHWAYS LEGISLATION.

Early attempts at highway legislation in England were feeble in the extreme, and quite inadequate to effect tangible improvement in the condition of the roads. One of the first laws relating to the roads was passed in the reign of Edward I., and ordered that the waysides should be cleared of trees, dikes, and other things likely to afford concealment for robbers. Absence of wheeled traffic without the towns, consequent upon the neglect of the country roads, had caused the latter to decrease in width in many parts of England through the unhindered growth of vegetation. So long as the passage-way permitted a horse to struggle along it, the "road" was good enough, or rather not too bad, for our ancestors. Highway robbery was never so rife as in the days of bad roads, when the impediments to travel reduced traffic to the narrowest limits and roads were lonely.

The best—or less bad—roads in Early England were those used by the pilgrims, which the various religious houses assisted to keep in repair. The Pilgrims' Way from Winchester to Canterbury—still in good condition in many places—is the most notable example we possess of an Early English road. The actual construction of the Way, however, goes back to pre-historic times.

In 1346 Edward III. granted the Master of the Hospital of St. Giles-in-the-Fields in London the right to levy for two years a toll upon all carts using the highways adjacent to the Hospital. These roads (now High Street and St. Martin's Lane) had become

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MOTOR TRAFFIC.

so deep in mire as to be impassable, and their condition was but typical of the state of English roads during the rainy seasons at that period. Henry VIII. passed Acts to "encourage" the repair of highways in Sussex, one of which permitted any person to lay out a new road on his own lands and to acquire the old highway as recompense. What tangible effect this had in improving the roads of Sussex history does not record.

In the middle of the sixteenth century expanding trade caused an increase of traffic on the roads, in spite of all obstacles, and it became obvious that something had to be done to get the roads into proper condition. An Act passed by Philip and Mary in 1555 decreed that "the highways being very noisome and tedious to travel in, and dangerous to all persons and carriages, every parish shall annually elect two surveyors of the highways to see that the parishioners, according to their own lands, abilities, farms, etc., send their carts, horses, men, and tools, four days in each year, for mending the roads."

Excellent in theory, the Act was futile in practice. Everybody's business was nobody's business. The annual road repairing became a sort of village holiday; those who did not care to work watched those who did. Farmers and others gathered as many men as they could by pay, ale, or persuasion, and repaired the roads about their own farms and lands, while the Queen's highway was left just as it was. Five other Highways Acts were passed in Mary's short reign. Legislation had really begun.

THE DAWN OF REFORM—HOW A NEW VEHICLE CAUSED THE ROADS TO BE IMPROVED.

It is from Elizabeth's time that the dawn of reform in our highways may be dated. The four-wheeled coach was introduced from the Continent. At first it was the object of general ridicule, and the people, who had—like their ancestors before them—been used to travelling on horseback, regarded it very much in the light that our own generation regards the Bath chair—a conveyance only for the infirm. Hitherto, practically the sole vehicle used for road travelling was the long wagon, which first appeared in the time of Henry VI. This was a kind of caravan on four wheels, with two apertures at each side for windows, and was hauled by a team of five strong horses in single file, with two drivers to guide them. The long wagon was the recognised form of locomotion for country-women and infants, and invalids. It managed to get along somehow, and was equipped with a proper breakdown outfit. Beneath the body of the wagon was suspended a chest containing tools and tackle, so that when mishaps occurred through the roughness of the roads, the drivers, with their five horses and outfit of picks and spades, crowbars and chains, and other implements, managed to get the long wagon on the move again.

When the four-wheeled coach came along in opposition to the accredited and old-established custom of travelling on horseback, prejudice made a great fight against it. Prejudice might have won, too, and the four-wheeled coach have returned whence it came, as an unmitigated nuisance, had not Queen Elizabeth herself taken a liking to the novelty. The Queen acquired a four-wheeled coach for her own use. Where Her Majesty led her dutiful subjects followed—royalty was ever a pioneer of innovations. The four-wheeled coach became the sign of diginity and wealth, of rank and fashion, and the coaches came and went about London, creating as great a stir amongst the people as the first motor cars did in later times.

Now, the four-wheeled coach went along very well in the town, where there were roads of a sort; but when it got outside in the country highways the trouble began—the vehicle wouldn't fit the road. So legislation had perforce to be directed towards the improvement of the ways—the road was to be made to fit the vehicle! In all, nineteen Acts were passed for bettering the highways in Elizabeth's reign, the majority of them after the coming of the four-wheeled coach. To be sure, an Act was passed in 1601 (43 Elizabeth) to prevent "the effeminacy of men riding in coaches," but this, after being honoured in the breach, was repealed in 1625, in which year twenty hackney coaches were set up for public hire in the metropolis.

About this time the Thames watermen raised a great outcry against the coach, which they feared would divert traffic from the river to the road. In 1635 the sedan chair was introduced "to interfere with the too frequent use of coaches, to the hindrance of the carts and carriages employed in the necessary provision of the city and suburbs." The hackney coachman reviled the chairman, and the chairman reviled the hackney coachman; while coach and chair were alike anathema to the waterman.

RELAPSE—MAKING THE VEHICLE FIT THE ROAD.

Progress in locomotion was actually taking place, and improvement in the roads was moving in its train, slowly but surely. Coaches became numerous, and the transport of goods by wheeled carriages became general—the pack-horse had had its day. Outside London travelling by vehicles increased, in spite of all hindrances. Then suddenly prejudice was revived, and the fantastic notion was conceived that the better way of "improving" the highways would be to preserve them from the normal wear and tear of traffic; so legislation was diverted from the roads to the vehicles using them, and all sorts of restrictions were levied upon wheeled carriages.

Fitting the vehicle to the road first became a hard and fast corollary of highways legislation in the reign of Charles I. In 1629 a proclamation was issued commanding that "No common carrier, or other person whatsoever, shall travel with any waine, cart, or other carriage with more than two wheels; nor with above the weight of twenty hundredweight; nor shall draw any waine, cart, or other carriage with above five horses at once." The proclamation of 1629 was really a repetition of one which had been passed seven years previously by James I., and imposed similar restrictions because "the highways were ploughed up and the bridges shaken by 'unreasonable' carriages."

The condition of the highways when these remarkable edicts went forth—seeing that it required "five horses at once" to draw a two-wheeled cart carrying a load of one ton—was eloquent tribute to the policy of fitting the vehicle to the road.

FURTHER HIGHWAYS LEGISLATION

During the Civil War, which broke out some few years after the passing of the above-mentioned Act, the roads became infinitely worse, for they had to withstand the stress of every form of military traffic, and restrictions upon vehicles in war time went the way of a good many other peace-time regulations.

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When the Restoration took place, highways legislation was at once forced upon the attention of Parliament again, and the Turnpike Trusts were evolved. The first Act in this category was passed in 1663, when the condition "of the ancient highway and post road leading from London to York and thence into Scotland" was, "by reason of the great and many loads which are weekly drawn in waggons," "very ruinous and almost impassable," as were indeed the highways of the country generally.

Syndicates were formed for the purpose of maintaining sections of the roads in proper repair, the money thus disbursed being recovered by the levying of a toll upon the traffic passing over the particular highways dealt with. The measure of 1663 was attended with a certain amount of success. The state of the roads about this period may be gathered from the fact that William III. formed what is now Rotten Row, in Hyde Park, as a private road to facilitate His Majesty's journeyings between St. James's and Kensington, the regular "king's highway" through Knightsbridge being absolutely unfit for use. In 1706 what is known as the first Turnpike Act proper was passed, with the result that over 1,100 Turnpike Trusts were established in England and Wales, with something like 23,000 miles of roads under their charge. The roads at last seemed in a fair way to become capable to meet the requirements of traffic.

MAKING THE VEHICLE ROLL THE ROAD.

Although the roads were improving, the development of wheeled traffic was retarded by all sorts of perverse regulations. Every Act for the control of the highways bristled with them, particularly after our legislators conceived the brilliant idea that certain vehicles could be utilised for "levelling" the roads over which they travelled. The construction of wagons with wheels of inordinate width was encouraged, and special privileges—such as exemption from the highway tolls and the right to carry increased weights—were accorded to them. The stage wagon lumbered along on wheels sixteen inches wide, carrying a load of eight tons, and drawn by as many as ten horses. This unwieldy vehicle was permitted to have conical wheels (i.e., wheels with the outer diameter several inches less than the inner) which were supposed to be able to bear a greater weight than those of the usual cylindrical form. Instead of levelling the roads, these conical wheels literally tore them into ribbons. In consideration for this public service, wagons with 16-in. wheels were allowed the free use of the turnpike roads for one year, a period which was afterwards increased to five years. Then there were the "stragglers," or wagons having a wider gauge for the rear wheels than for the fore wheels—considered more effective for rolling the road—which were allowed to carry heavier loads than vehicles with both sets of wheels of one gauge.

The old Highways Acts were the origin of the adage that a coach and four can be driven through any Act of Parliament. The width of the wheel regulated not only the weight to be carried, but the amount of toll a vehicle should pay. There were graduated scales all in favour of the big wheel—which "rolled the road"—in both cases. The wainwright overcame the question of the limitation of loads by giving particular attention to the design of wheels. All sorts of fantastic innovations were made in wheels generally. There were conical wheels with extra wide felloes and triple tyres, the middle tyre projecting an inch or so beyond the two others; wheels with large raised studs on the tyre; and wheels, conical or cylindrical, of every pattern such as the skill and ingenuity of the wheelwright could devise, in order to derive advantage from the absurd clauses of the Highways Acts. Vehicles with normal wheels, doing little or no injury to the roads, were penalised both as regards the weights they were to carry and the amount of toll to be paid.

The wagon with 16-in. wheels carried eight tons, and travelled free of toll; that with 9-in. wheels carried 6½ tons and paid full toll, as did those with 6-in. and 4½-in. wheels, which carried loads of 4¾ tons and 4¼ tons respectively. These were the weights for the summer months, the winter loads being less.

Our latter-day highway regulations afford a very interesting analogy. The heavy steam-driven traction engine, with corrugated iron-tyred wheel of great width, hauling a train of trucks—each carrying several tons—makes no contribution towards highway maintenance, simply because steam is the motive power employed; whilst petrol-driven vehicles of every kind are compelled to pay heavy taxes—on their petrol, ostensibly—towards the upkeep of the roads, to which they cause infinitely less wear and tear.

TRIUMPH—THE ROAD IS MADE TO FIT THE VEHICLE.

Now, all attempts to adapt the vehicle to the road in the past had the result which might have been anticipated—the roads became worse. The faction of the road blamed the vehicle, and the faction of the vehicle blamed the road. Our highways legislators considered that the proper maintenance of highways was not an art requiring skill and science. There were some, however, who were induced to think otherwise.

About the beginning of the nineteenth century McAdam—greatest and most sensible of road-builders—appeared upon the scene, and demonstrated the futility of enforcing a hundred and one restrictions upon vehicles—the loads they were to carry, the width and form of their wheels, the weights of the vehicles themselves, and the like—while the main point at issue, the surface of the roads over which they were to travel, did not receive adequate attention. Dealing with the roads around the metropolis, McAdam pointed out that they were constructed chiefly of gravel, which was a defective material because it contained earth, and the component parts being of very unequal size, and of a round form with no points of contact, coalescence and the formation of a smooth surface could not be obtained. Consequently, the roads whereon traffic was heavy were always loose and needed constant repair, and no matter what attention was given to them, unless the roads were made of the proper material, properly laid down, they could never be satisfactory. McAdam said, in brief, that the road should be fashioned to the vehicle, and the authorities, in a lucid interval, listened to him, and macadamised roads came into existence. McAdam laid it down as an important part of his system of road-making, that when roads were newly made up they should not be left to chance and be put in repair only when they became impassable, and therefore be entirely reconstructed, at great expense; but that a new road, made on his principle, should be watched for some considerable time after it had been constructed, and as soon as it

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MOTOR TRAFFIC.

showed the slightest signs of wear and tear every inequality should be at once filled up, until a hard and level surface had been obtained. Under these conditions, said McAdam, a road would last for years without further attention, and it would be immaterial what weights or wheeled vehicles travelled over it.

Things transpired just as McAdam had foretold. Parliamentary and local legislators grumbled less about the vehicle, and concentrated their attention upon the road which it used. By adopting McAdam's system of road-making, the highways were improved out of all knowledge, and by the second decade of the nineteenth century the roads of Britain had attained a condition of excellence such as had been undreamt of in the past. Coaches performed the longest journeys in almost incredible time, and the rapid transport of goods by road was an important factor in the increase of commerce and industry. When at last, through the medium of steam, new methods of locomotion were devised and railways introduced, the highways of Britain occupied an importance in the sphere of national activities such as had never been attained in any other period of history—*the result of fitting the road to the vehicle.*

It remains to be said, however, that the deep-rooted prejudice against new vehicles never quite disappeared. In 1828, when the practibility of steam locomotion on the roads was demonstrated, keen opposition was manifested in many spheres to steam-propelled carriages. The road authorities were up in arms against them, and influenced Parliament to levy excessive tolls upon the new vehicles. A committee set up in 1831 advocated the equalisation of tolls upon all carriages, whether horse or steam, but its recommendation was ignored, with the result that the steam-carriages were driven off the road, contracts already made for their construction were annulled, and the motor-car industry, on its original inception, ruined by bigotry and prejudice.

Enactments regarding the wheels of vehicles lapsed when the General Highways Act (5 and 6 William IV., c. 50) was introduced in 1835. The Act of George IV., passed some twelve years earlier, began by having a good third of its clauses devoted to restrictions upon vehicles—the road was more or less a secondary consideration to the framers of this "Highways" Act.

Had railways in their early days been controlled by methods similar to those which obstructed the development of our roads in past eras, they would never have advanced beyond the stage of the "Puffing Billy" and the "Rocket." Permanent way and rolling stock were improved commensurately, improvements in the latter were never retarded by shortcomings in the former—the railroad is made for the train which passes over it.

PRESENT DAY RESTRICTIONS UPON TRAFFIC.

Attempts to make the vehicle fit the road are not unknown in present-day highways legislation, largely as a result of the multiplication of authorities responsible for the control of our roads and the vehicles using them. While the development of motor traffic has led to a great improvement of the highways in areas where the authorities have endeavoured to cope with the new conditions, in other districts the idea appears to prevail that the ordinary water-bound macadam road which proved good enough in the era of horse traction should suffice for latter-day motor traffic, and that if it prove unable to withstand the stress, then the life of the bad road should be prolonged by restrictions being placed upon the vehicles using it.

During the past three years the roads of Great Britain have been subjected to a traffic without precedent in its vastness. Apart from the great increase in commercial and personal locomotion by road, an enormous military transport traffic has come into existence. Even the best of roads would not be impervious indefinitely to such a strain; that inferior roads have succumbed to it is no matter for surprise. Recent experiments have demonstrated that a road constructed on McAdam's principle, but with a surface composed of artificial asphalt prepared from refuse-destructor clinkers bound with special bitumen, is capable of withstanding the heaviest traffic of mechanically propelled vehicles, and is far less costly to maintain than is the ordinary broken-granite road. When road making is standardised, and the highways throughout the country partake of the same character—and that the best the road-constructor can devise—there will be some grounds of justification for placing limitations upon heavy vehicular traffic; but while all demands in the latter connection emanate from those in control of defective highways, it would appear as though the futile policy of "fitting the vehicle to the road" still has its protagonists in certain quarters.

When we consider the important part that the highways of this country have played during the present crisis, and realise the measure of their contribution towards the easement of traffic on the congested railways, it cannot but kindle amazement to think that there are public servants who regard with favour the discredited idea of "Fitting the Vehicle to the Road."

AMERICAN MILITARY TRUCK CONFERENCE.

The American Society of Automotive Engineers recently held in Washington a three-day conference of truck, engine, transmission, axle, frame, and accessory manufacturers, for the purpose of co-ordinating the production of the units to be installed in the U.S. Government military trucks. The purpose is to bring about interchangeability of these truck elements so far as possible, rather than to standardise them fully. Interpretations of the War Department specification (which was published in full in our issues June 14 and July 12) satisfactory to all will, it is believed, be the result of this conference. Several of the transmission manufacturers believe, however, that their product can be completely standardised.

One of the interesting developments is stated to have been a general expression of opinion that it is practicable to standardise length and width of the military truck leaf springs. This had never been attempted or proposed seriously before. Next to tires, springs require replacement on military trucks more frequently than anything else. Another interesting result of special study is an air cleaner to be installed at the carburetter inlet to keep the astounding amount of dust collected in military truck service out of the engine. In general the truck units will be co-ordinated as far as possible without delaying prompt general production. According to an S.A.E. bulletin the Government will be supplied with as many trucks of a suitable type as it can possibly need.

A sub-committee, constituted of members of the Society of Automotive Engineers, is now at work in Washington checking up the detail mounting dimensions proposed at the last meeting. Quarter size drawings of the trucks are being prepared for general use.

VALUE OF MOTOR CARS TO TRAMWAY MANAGERS.—At a meeting of the Oldham Tramways Committee the chairman, Councillor Cheetham, referring to the record tramway receipts at Whitsuntide, said that one of the great advantages of having a motor car was that the management was able to keep a close eye upon the traffic. Mr. Priestly, the manager, estimated that at least £50 of increased revenue had been secured owing to the fact that by the use of the car they were able to keep in close touch with the traffic and to transfer the tramcars from one section to another as required.

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MOTOR TRAFFIC.

PETROL-ELECTRIC OMNIBUSES.

Among the motor vehicles whose reputation for reliability and low working cost has been enhanced by the heavier traffic engendered by the war the Tilling-Stevens takes a high place. In the metropolis an increased number are engaged in public passenger and industrial work, particularly on the roads connecting with the Royal Arsenal at Woolwich. In the provinces, too, municipal and private users have been supplied with as large a number as the Ministry of Munitions have from time to time been able to release from production for Government purposes.

An illustration is given on this page of a petrol-electric vehicle recently supplied to the Wolverhampton Corporation Tramways Department by Tilling-Stevens, Limited, of Maidstone, and Victoria Street, S.W. The body is of the most up-to-date type of single-deck construction, which alone would render it popular with the public.

Tilling-Stevens Petrol-Electric Omnibus Purchased by Wolverhampton Corporation.

who are also keenly appreciative of the smoothness of control of the petrol-electric machine. This feature has an important bearing on the question of maintenance and working costs.

BIRMINGHAM AND MIDLAND OMNIBUSES.

At the annual meeting of the Birmingham and Midland Omnibus Company, which is controlled by the Birmingham District Power and Traction Company, Mr. C. S. B. Hilton (chairman) said that the services had been reduced, and the less remunerative mileage had been eliminated. Fares had been increased, and the result was that the company was able to pay a dividend of 5 per cent. on the ordinary shares. It was probable that further restrictions of traffic would have to be made during the present year. Every omnibus in regular service contributed in taxes from £50 to £60 per annum, or about one halfpenny per mile run, which ought to be spent in road maintenance, but during the war it had been diverted to other objects. Meanwhile individual road authorities were endeavouring by other means to compel omnibus owners to contribute to road maintenance in addition to the heavy sums paid to the local rates. This was very undesirable, and he hoped it would be strongly resisted.

Increase for Maintenance.—The City of London Corporation has agreed to an increase of 33⅓ per cent. on the maintenance contract for its six Thornycroft wagons as from April last.

U.S.A. MOTOR EXPORTS.

Great Britain the Heaviest Buyer in March.

In March last the United States shipped motor trucks, passenger cars, and parts to the value of 10,030,973 dollars, compared with 6,897,086 dollars in February, and 10,494,365 dollars in March, 1916. There were 1,040 trucks exported in March, as compared with 784 in February, amounting in value to 2,961,389 dollars, as compared with the February value of 2,128,865 dollars. The shipments, however, are not as large as in March, 1916, when 1,878 commercial vehicles were exported, valued at 4,909,179 dollars. Passenger car exports were increased nearly 66⅔ per cent., while truck shipments were increased over 50 per cent.

Notwithstanding the prohibition of motor car imports in this country except under licence, the American return states that the United Kingdom was the largest purchaser in March, her purchases increasing over 1,500,000 dollars. Canada doubled her purchases during March, the total exports to that country being 1,208,655 dollars, compared with 526,767 dollars. Chile was the biggest buyer in South America. Australia tripled her purchases, being third largest in point of American automobile and truck purchases, which totalled 365,527 dollars, compared with 127,388 dollars in February.

For the eight months ended March, the United States shipped 85,614,953 dollars worth of automobiles, trucks, and parts, compared with 89,723,053 dollars in the corresponding period in 1916. Though the value decreased, the number of cars and trucks are practically the same, namely, 55,143, as against 55,140 for the 1916 period.

HALFPENNY OMNIBUS FARES WITHDRAWN.

The London General Omnibus Company abolished halfpenny fares on their omnibuses as from July 9, as well as fares with halfpenny denominations, such as 1½d. and 2½d. The maximum distances for 1d., 2d., etc., are not altered. The change was made owing to the difficulty of collecting fares on the omnibuses which are so heavily loaded because of the reduction in their number. The withdrawal of halfpenny fares, it will be noted, follows on a similar course in regard to London tramway fares, but on the tramways there are still 1½d. and 2½d. fares.

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MOTOR TRAFFIC.

HILL CLIMBING EXTRAORDINARY.

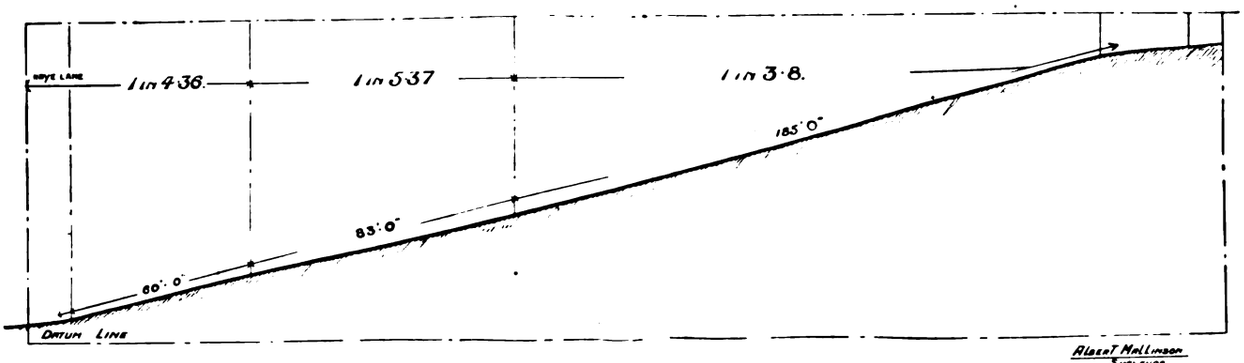
LOADED KARRIER LORRIES ON A GRADIENT OF 1 IN 3·8.

The accompanying illustrations and diagram represent admirably a notable performance of two Karrier live-axle lorries built by Clayton and Company (Huddersfield), Limited, to the standard specification W.D.S. The photographs indicate forcibly the severity of the test, and the account of a correspondent which we append is in its terse and unadorned narrative sufficient commentary on a feat of which the makers of the lorries may well be proud.

"We left Karrier Works, turned along St. Thomas' Road to the right until we came to Longroyd Bridge, and then turned to the left along the Manchester Road. From this point the Manchester Road is uphill all the way. Immediately after passing under the railway bridge we noticed the road branched to the right and left. We kept to the right, and soon passed the Warren House, which, by the way, is close to the bottom of a steep road with a very bad surface known as Deep Lane, Huddersfield, up and down which Karriers are regularly tested. We kept to the main road, and could see Deep Lane cutting its way like a path, as it were, along the side of a cliff, gradually getting higher and higher above our heads until it took a sharp upward grade and disappeared out of sight. On looking on our right we were surprised to see how high we were climbing all the way, for we could see many busy districts lying away down some hundreds of feet below. We didn't stop here. We were out to see an even steeper hill. About two miles farther on we left Cowlersley Lane on the left, and, still keeping the main road ahead along the tramlines, we shortly after arrived at our destination, namely, Church Avenue, Linthwaite. On looking up the hill we thought it utterly impossible for a heavy vehicle to climb it. It starts at absolutely right angles to the main road, and there is no chance of getting a start at the hill by going back a few hundred yards, opening out and getting up speed. It isn't possible to take the right-angled corner at any speed. Consequently any heavy vehicle attempting to climb this hill must start from rest.

A Stop for Inspection on a Gradient of 1 in 3·8.

"The two Karriers took the hill with remarkable ease. The photographs illustrate the different stages of the climb. The steepness of the hill can be gauged from the fact that in most of the photographs one can see above the roofs of the houses which are half-way down the hill. The Karriers were stopped and re-started and reversed on the steepest part of the hill, which is 1 in 3·8, and the road just here is very rough and broken. In two of the photographs Golcar can be seen right away in the distance, and the hills beyond. After passing the steepest point of the hill, we bore slightly to the right, took another steep hill, and came out on the top road by Linthwaite Church. The lorries were loaded with 4-ton test weights. Not once during the climb was there the least indication of the water in the radiators having reached boiling point. As a matter of fact, it was quite easy to keep one's hand on the top of the radiator without the least discomfort."



Section of 38 ft. Main Street between Kaye Lane and Slant Gate in the Urban District Council of Linthwaite.

At the Top.

"Our visit to Karrier Works," adds our correspondent, "was an unexpected one, and the two vehicles were part of a weekly output. We saw each photograph taken, and were asked to look at the picture on the screen before the exposures were made, and can state that each is a genuine unfaked picture. The diagram of the hill was supplied by the surveyor of Linthwaite, and signed by him, and is drawn to scale."

OMNIBUS OWNERS' ASSOCIATION.—Application has been made to the Board of Trade for a licence to enable an association about to be formed under the name of "The London and Provincial Omnibus Owners' Association (Incorporated)" to be registered with limited liability without the addition of the word "limited" to its name. The association will take over the assets of the London Omnibus Owners' Federation and the Provincial Omnibus Owners' Association, watch over and protect the interests of owners of omnibuses, and promote the consideration and discussion of all questions affecting the business.

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Approaching the End of the Climb—Golcar can be seen in the Distance.

The Two Karriers were Stopped, Re-started, and Reversed on the Steepest Part of the Hill. The road just here is very rough and broken.

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MOTOR TRAFFIC.

STRAKER-SQUIRE MOTORS IN WAR SERVICE.

The important part played by motor transport in every phase of the stupendous world struggle, now unfortunately entering into its fourth year, cannot be overrated. All the leading motor manufacturers have had their resources severely taxed in an endeavour to keep pace with the demands from the various Government departments for new machines, while a large number of vehicles of approved type were commandeered in the earlier days, and have since done yeoman service. Hitherto the information obtainable

Fig. 1.—The Arrival of "Les Anglais," August, 1914.

on the destinations and performances of these machines has been very meagre, and only of a general character. Recently, however, there appears to be a disposition to allow more detailed information with regard to the work of individual manufacturers to be published. Taking advantage of the altered conditions, Straker-Squire, Limited, of Wilson Square, Blackfriars, London, have just issued a handsome brochure entitled "Our Part in the War," in which they indicate some of the services which Straker-Squire machines have rendered to the Allies in France, Belgium, and various parts of our Empire.

Beautifully printed in two colours—brown and blue—and well illustrated, the book is divided into sections or chapters, each dealing with a particular phase of the war. In the first phase it

Fig. 2.—A Park of Army Transport Wagons.

is stated that "After the first shock of surprise was over the whole industrial world was drawn upon to meet the urgent need of the moment, and the war authorities, quick to recognise the important part the motor was to play in the great struggle, at once commandeered every suitable vehicle. Amongst the thousands of motor lorries and passenger vehicles taken scores upon scores of Straker-Squire machines were impressed into service by the Government, and this led to some curious anomalies in the fighting area in the early days of the war. Lorries and vans which up to that moment knew no more exciting experience than to ply in the streets of London or to deliver groceries in Surrey lanes suddenly found themselves within the zone of battle, and subjected not infrequently to shot and shell; and names and businesses familiar to every Englishman appeared in most unlooked-for places." A typical instance of this is shown in our first illustration, which depicts the reception accorded to the British soldiers by the inhabitants of a quiet town in northern France when proceeding to their station on a vehicle once owned by Messrs. Maple and Company. A number of other illustrations are given in this section of the brochure, each reproduced from snapshots taken within sound of the German guns, and during a time when the vehicles illustrated were being subjected to the most prodigious tests of endurance and reliability in circumstances which can truly be described as abnormal.

The war-worn machines, which Messrs. Straker-Squire state with reasonable pride came through the ordeal with flying colours, had soon to be replaced. Rapid developments in the production of new vehicles ensued, and with their works concentrating exclusively on the war model, the weekly output was more than doubled. Fig. 2 shows an impressive scene behind the front in France, where a large

Fig. 3.—Straker-Squire Lorries with the Russian Army.

number of army transport wagons are "parked." The "Straker" machines are seen on the right of the picture.

The second phase dealt with in the book refers to the use of Straker-Squire vehicles by our Allies in Russia, France, and Italy, and also in our overseas dominions. There are a number of illustrations showing some of these in service, and the variety may be gathered from the two illustrations here reproduced. Fig. 3 shows a fleet of wagons supplied to the Russian war department, and Fig. 4 a lorry filled with native soldiers taking part in the offensive in East Africa. Messrs. Straker-Squire claim that wherever our armies are engaged in the field their automobiles play an essential part in their daily existence and efficiency.

In the "Home Service" section of the book it is truly stated that "the maintenance of a fighting force in the field entails such a vast organisation at home, and has such numerous branches, that it is not possible to deal with them all in a record of this character." A good showing is made, however, and a number of illustrations make it clear that the Straker-Squire machines are

Fig. 4.—Native Troops on the East African Front.

well represented in each of the departments. Thus we are shown the type of machines supplied to the Admiralty, the Air Board, H.M. Stationery Office, and a number of typical examples in service for munition manufacturers. The care of the wounded has a separate chapter, and from this we gather that a large number of Straker-Squire ambulances are engaged in Red Cross work both at home and abroad. These vehicles, it is stated, have been selected for their speed and absolute reliability. In their build and arrangement everything has been done to ensure swift, easy running as well as absence of road trouble, and from the reports received Messrs. Straker-Squire are satisfied that the care and thought bestowed upon their construction has been fully recognised.

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MOTOR TRAFFIC.

The final word in the book is reserved for the "Woman's part in the war." Under this heading three illustrations are given, each showing the active interest women are taking in the Straker-Squire machines on war service. It is claimed that they are exceptionally popular with women drivers, being easy to handle, smooth running, and free from breakdowns. Free copies of this interesting record can be had on application to Straker-Squire, Limited.

EASTBOURNE MOTOR OMNIBUS RESULTS.

The accounts of the Eastbourne motor omnibus department for the past financial year are of interest as showing in a striking manner the effects of the petrol shortage upon the services instituted by a municipality which pins its faith entirely upon road motor traffic to the complete exclusion of tramways. The total cost of operation of the vehicles owned by the department has risen to an astonishing degree. Two years ago it was almost exactly 1s. a mile. Last year it had gone up only about ½d., but the comparatively low figure was due partly to the fact that the payment of instalments on omnibuses purchased out of revenue was almost complete. The rise in operating expenses between 1915 and 1916 was really in the neighbourhood of 2d. a mile. This year the total cost is just over 1s. 8d. a mile, of which about 3¼d. is represented by the payment of instalments and interest on loans. The running expenses, excluding the cost of repairs and maintenance, management, general expenses, interest and instalments are now slightly higher than the figure including all these items for the year ending March, 1915. This big rise is almost entirely attributable to the petrol shortage, which has led to a reduction in the mileage covered by the department's fleet amounting to about 40 per cent. of the mileage covered two years ago. This reduction has naturally driven up the standing charges per mile materially, and in producing this effect it has been enhanced in no small degree by the increased cost of labour. The running costs have also been pushed up by the fact that the shortage in petrol has been accompanied by a big increase in price. Whereas a concern of this kind before the war could contract for petrol at about 8d. a gallon, the cost is now more than three times that amount. The omnibuses remaining in service are by no means all of the newest types, and the consequence is that more than 4½d. a mile goes to the cost of fuel. Naturally the reduction in mileage run is accompanied by some degree of overcrowding of the vehicles which, despite the specially low terms offered to soldiers, involves a considerable increase in the takings per mile. These now amount to about 1s. 6½d., to which must be added rather over 2½d. a mile for income from other sources, making a total of about 1s. 9d. a mile, which is sufficient to meet the expenditure and to leave a balance of about 1d. a mile, or, in other words, a net profit on the year's working of about £670, as against a profit of about £4,000 last year. At present several of the old chassis owned by the Corporation are lying idle, owing partly to the difficulty of getting the necessary work of repair and reconstruction effected. It is to be hoped that it will not be long before the whole question of motor fuels is so thoroughly studied and taken in hand as to render impossible at any future date a repetition of the state of affairs that now exists. Petrol is not the only possible fuel, and it is high time that we realised this fact, and made adequate provision in the matter of alternatives. Meanwhile, and unless this is done, the prospects of the general extension of the use of motor omnibuses by municipalities are likely to be jeopardised.

NAPIERS ON WAR SERVICE.

A speaking photograph is the term that may be applied to the illustration given on this page of a fleet of seven war-built lorries supplied to the War Department by D. Napier and Son, Limited, of New Burlington Street, W. These 30-cwt. machines are parked under the shelter of a wood alongside a road, and they are typical of the Napier military and commercial vehicles. The 30-cwt. lorries, as well as those of greater capacity, are rendering yeoman service in great numbers on all the fronts, and also for military work at home. Controlled and other business firms are also large users, thereby in many instances securing freedom from railway delays.

A Fleet of Napier Lorries on War Service.

MOTOR SPIRIT RESTRICTIONS.

A Motor Spirit Restriction Order, issued by the Board of Trade on July 12, provides that no person shall use or consume any motor spirit for the purpose of proceeding to or from any race meeting, whether for the whole or part only of the journey. The distance between a person's place of residence, whether permanent or temporary, and the railway station nearest thereto from or to which he can conveniently travel to or from a race meeting is not deemed to be part of the journey. The Order does not prevent the driving or use of a public omnibus or stage carriage if such vehicle is actually plying for hire on its ordinary and accustomed route, and at its ordinary and accustomed hours.

The Petrol Controller has pointed out that of the total quantity of petrol imported not more than 10 per cent. is allocated for private cars, including motor cars and motor cycles used by doctors and veterinary surgeons, Government inspectors of munitions, food production, etc., Red Cross workers, and others engaged on certified work of national importance.

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MOTOR TRAFFIC.

MOTOR VEHICLES FOR MUNICIPALITIES.

WIDNES CORPORATION intend to purchase a 5-ton petrol lorry and trailer.

MANCHESTER WATCH COMMITTEE have resolved to purchase two petrol-driven fire engines.

ROCHDALE CORPORATION have under consideration the purchase of additional motor vehicles.

NORWICH COUNCIL have purchased a four-seated motor car for police and fire brigade purposes.

WARRINGTON TRAMWAYS COMMITTEE have invited tenders for the supply of a motor tower wagon.

TODMORDEN CORPORATION have under consideration the use of town gas as fuel for its motor omnibus service.

BOLTON COUNCIL have obtained tenders for the supply of a battery vehicle for the electricity department.

SALFORD CORPORATION have decided to purchase two motor tipping wagons for use in the cleansing department.

CIRENCESTER URBAN COUNCIL have obtained a motor vehicle for the purpose of facilitating the collection of refuse.

DERBY COUNCIL have received delivery of a 5-ton electric tipping wagon from the General Vehicle Company, Limited.

ISLINGTON BOROUGH COUNCIL have accepted the tender of the Lacre Motor Car Company for the supply of a motor road sweeper.

QUEENSBURY URBAN DISTRICT COUNCIL has appointed a special committee to consider the question of purchasing motor ambulances.

WEST HAM COUNCIL have received tenders for the supply of two motor ambulance vehicles for general accident and medical work.

PERTH CORPORATION have decided to purchase a flexible holder for use in its motor omnibus service, which it intends to run on town gas.

BOLTON CORPORATION have under consideration a proposal to purchase an electric battery van for use in the electricity department.

ROCHDALE COUNCIL have ordered a steam vacuum emptying machine for the cleansing of street gullies, in order to overcome the shortage of labour.

BLACKPOOL COUNCIL have taken delivery of an electric van which will be used by the cleansing department. It was supplied by the General Vehicle Company.

MARYLEBONE BOROUGH COUNCIL have placed an order with the Lacre Motor Car Company for a motor sweeper, and with the Austin Motor Company for four vans.

SOUTHEND COUNCIL have referred to a special sub-committee a proposal by the borough surveyor for the purchase of electric tip wagons for the collection of refuse.

MORECAMBE CORPORATION have agreed to purchase electric omnibuses to replace the horse tramway cars. The conversion cannot take place until after the war.

WOLVERHAMPTON COUNCIL are obtaining a steam wagon from Foden's, Limited, of Sandbach, at £805. The body will comprise a movable tank for street watering.

YORK TRAMWAYS COMMITTEE recommend the purchase of an additional motor omnibus to serve the Leeman Road district. Several battery vehicles are already in service.

HUDDERSFIELD COUNCIL have been informed by the Ministry of Munitions that the latter are unable to facilitate the proposed purchase of battery-propelled vehicles by the Corporation.

POPLAR COUNCIL have utilised the profits of the electricity undertaking for several years in order to establish a fleet of motor vehicles for the removal of clinker, house refuse, and road sweepings.

MANCHESTER CORPORATION have ordered a motor road sweeper from the Lacre Motor Car Company in order to decide whether the whole of the horse-drawn sweepers shall be replaced with motor machines.

BIRMINGHAM CLEANSING COMMITTEE are purchasing two 4-ton steam wagons from the Yorkshire Commercial Motor Company, at £720. The vehicles will be used for removing clinker from the destructors.

HULL CORPORATION have agreed to purchase a 1 000-gallon water tank for hauling behind a steam wagon, in order to keep up the watering of the streets. This work has been interfered with owing to the impressment of horses.

WALSALL GAS COMMITTEE have placed an order with Messrs. Alley and MacLellan, of Shrewsbury, for a 4-ton rubber-tired Sentinel steam wagon, for £825. The body will be provided with one-man quick hydraulic tipping gear.

MOTOR TRAFFIC NOTES.

ELECTRIC VEHICLES FOR BUSINESS FIRMS.—After a lengthy trial, Messrs. J. Lyons and Company, Limited, the caterers, have decided to expend a large sum in replacing horses with electric battery vehicles.

COAL-GAS AS FUEL IN EDINBURGH.—The Scottish Motor Traction Company, Limited, have decided to equip a number of its vehicles to run on coal-gas. The machines so equipped will be confined to the short journey services.

EAST KENT OMNIBUS FARES INCREASED.—The working expenses of the East Kent Road Car Company having increased by 100 per cent., the fares have been raised to about 50 per cent. The company's vehicles run between Folkestone and other towns at the eastern end of the county.

ELECTRIC TIP WAGONS AT SOUTHEND.—The report of the borough surveyor upon the question of the purchase of electric battery tip wagons has been referred by the Highways Committee of the Southend-on-Sea Corporation to a special committee for further consideration.

PATRIOTIC GIFT BY THE ALBION COMPANY.—A 30-cwt. lorry has been presented to the National Council of the Young Men's Christian Association by the Albion Motor Car Company, Limited, of Glasgow. The gift will be of great service in the association's world-wide work among the British Army.

BRITISH WAR VEHICLES IN FRANCE.—It is estimated that there are 100,000 motor trucks serving the British army in France, and the number is being constantly added to. The census which has just been taken of steam wagons in the United Kingdom indicates an intention to largely augment the use of that class of vehicle for military work.

AN INDUSTRIAL ALCOHOL SCHEME.—At a national convention of the Strength of Britain Movement at Caxton Hall, Mr. C. J. Stewart, on behalf of the committee, laid before the convention the constructive proposals of the movement for the duration of the war. According to these there would be no necessity for State purchase of the liquor traffic. The distilleries would be used for producing industrial alcohol.

LESS PETROL FOR TRAMWAY DEPARTMENTS.—The Petrol Control Committee have reduced the allowance of petrol for the emergency power wagon of the Hull tramways from 132 to 88 gallons per month. In order to economise the supply, a horse-drawn wagon is used at night. The summer omnibus services in connection with Bournemouth tramways are being maintained as far as the supply of petrol will allow.

A WELSH OMNIBUS SERVICE AT A STANDSTILL.—Application has been made by the South Wales Transport Company to the Bedwas and Machen District Council for a renewal of the motor omnibus licences held during the past two years. As the running was suspended at the time of the application, the Council replied that they would consider the question of renewal when the company were able to restore the service.

MR. A. A. REMINGTON, of Wolseley Motors, Limited, has been elected chairman of the Technical Committee of Motor Industries. Lieut.-Col. R. K. Bagnall, R.E., is the vice-chairman.

H. G. BURFORD AND COMPANY, LIMITED.—CHANGE OF ADDRESS.—In consequence of the Government taking over Trafalgar House, H. G. Burford and Company, Limited, have removed to 10, Regent Street, S.W., to which address all communications should be sent.

MR. THOMAS BLACKWOOD MURRAY, a director of the Albion Motor Car Company, Limited, has received the degree of D.Sc. from Edinburgh University for his thesis, "Some Researches and Inventions in Hydraulic, Electrical, and Motor Vehicle Engineering."

KARRIERS FOR HEAVY HAULAGE.—One of the most original and attractive advertising publications that we have recently received is a descriptive folder describing "Karriers" for heavy haulage. Within a plain tasteful grey cover, containing on the first page an effective drawing, is a sheet which when opened measures 20½ in. by 10 in., and displays well-executed photographic reproductions of a plan and elevation of a 50 H.P. 5-ton chain-drive type B.R. 110 industrial chassis manufactured by Clayton and Company (Huddersfield), Limited. Adjacent to the photographs is printed the specification, so that the reader has under his eye at a glance illustrations and particulars of this notable machine, which the company has designed for general heavy haulage. The engine is the largest fitted for British War Office specification. The folder also contains small views of a number of "Karrier" vehicles of various types. The booklet, which was written and designed by Mr. W. J. C. Stock, manager of the Karrier publicity department, is admirably printed, and is a first-rate specimen of good advertisement production.

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THE

Tramway & Railway World

Vol. XLII. No. 9.] LONDON, SATURDAY, AUGUST 18, 1917. [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

KETTERING URBAN DISTRICT COUNCIL.

Electricity Department.

The above Council invite Tenders for the supply and laying complete in stoneware troughing of 754 yards 0·6 sq. in. concentric lead-covered paper cable (600 volts) together with three-core pilot, feeder pillar, dividing boxes and switchboard instruments.

Copy of Specification and Form of Tender may be had on application to Mr. W. A. Walker, Electricity Works, Kettering. Tenders, endorsed "Tender for Feeder Cable," to be delivered to me on or before 12 o'clock noon on Tuesday, August 28, 1917.

The Council do not bind themselves to accept the lowest or any tender.

Council Offices, Kettering,
August 10, 1917.

JOHN BOND,
Clerk to the Council.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

TO UNIFORM CONTRACTORS.

The Walthamstow Urban District Council invite tenders for the supply of Uniforms, including Oilskin Coats and Leathern Gaiters, for their tramway employees during the twelve months ending March 31, 1919.

Forms of tender and further particulars may be obtained from Mr. W. Murray, A.I.E.E., Tramways Manager to the Council, Tramway Offices, Chingford Road, Walthamstow.

Sealed Tenders, endorsed "Tender for Tramway Employees' Uniforms," to be delivered by post only to the undersigned not later than 5 o'clock p.m. on Wednesday, August 29, 1917.

The Council do not bind themselves to accept the lowest or any tender, and reserve to themselves the right to accept the whole or any part of a tender.

The Contractors will be required to pay the whole of their workmen such rates of wages and observe such hours of labour as are recognised by the various trade unions and in force at the time of signing the Contract.

C. SIDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
August 14, 1917.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

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POSITIONS VACANT.

ASSISTANT ENGINEER.

Wanted Assistant Engineer for D.C. Works; must have power station experience, and be ineligible. Apply, giving full particulars of age, experience, whether married or single, and salary expected, to the Electrical Engineer, Council Electricity Works, Aldershot.

ARMATURE WINDER.

Armature Winder wanted, experienced in the repair and rewinding of tramway motors.—Apply with copies of references to R. H. WILKINSON, General Manager, Corporation Tramways, Huddersfield.

ARMATURE WINDER.

Armature Winder wanted with experience in repair and rewinding of tramway motors. Rate 1s. o½d. per hour. Must be ineligible for H.M. Forces and able to obtain a Leaving Certificate if necessary. —Apply with copies of references to T. R. WHITEHEAD, General Manager, Corporation Tramways, Coventry.

ARMATURE WINDER.

Armature Winder, used to tramway motors and other general repairs.—Apply with copies of references, stating age, wages required, and whether ineligible for H.M. Forces, to BOROUGH ELECTRICAL ENGINEER, Electricity Works, Keighley.

FITTER.

First-class Fitter for electrical and mechanical repairs to tramcars · rate 1s. o½d. per hour, with the trade rates for overtime. Also Charge-hand for running shed, commencing wages 10½d. per hour, overtime at time and quarter, and time and half for seventh day. Applicants must be ineligible for H.M. Forces, and able to obtain a leaving certificate if necessary.—Apply, GENERAL MANAGER, Corporation Tramways, Coventry.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

WANTED.—Copies of the TRAMWAY AND RAILWAY WORLD of January 11, 1912; January 1 and 13, 1916; April 13, 1916; May 11, 1916; and October 9, 1916.—Reply to Box 12, The TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

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Sole Selling Agents for S. Dixon & Sons' Tramway Material,

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THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE. NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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SATURDAY. AUGUST 18, 1917

WOMEN INSPECTORS AT LEEDS.

As reported in another column, the strained relationships which had arisen at Leeds owing to the appointment of women as ticket-inspectors have been adjusted to the mutual satisfaction of the Tramways Committee, the employees, and the public. The trouble has been described as a "sex war," but, as a matter of fact, there hardly seems to have been a real objection on the part of the women conductors to the employment of women *per se* as inspectors. They appear, however, to have regarded it as an innovation and to some extent as a reflection upon themselves. The fact was that in appointing women inspectors to take the place of men who had gone on active service, the management was merely pursuing the policy which it has consistently followed since the outbreak of war. Whenever men were released for service—and an extraordinary large percentage of eligible men has been so dealt with—the positions were filled by other men ineligible for military service and later by substitutes released from service. For some time it was found possible in this way to avoid the appointment of women as conductors. Until recently the management has been able to secure sufficient men for inspectors and motormen, and it was only when they had no spare men available for the work that the employment of women as inspectors was decided upon. The idea throughout had been to continue the normal arrangements as long as possible. On the announcement being made that it had become necessary to appoint women selected from the ranks of conductors as inspectors, the women conductors—for reasons which, as stated, are not very clear—refused to recognise them, and threatened to cease work unless they were withdrawn. The most definite objection appears to have been that they considered there were still men in the employ of the tramways as conductors who could be utilised as inspectors. They pointed out that it has become an established practice during the war not to place women in positions formerly occupied by men unless male labour is unavailable; and in their opinion there were several men in the department who had the necessary qualifications, although the committee had stated that there were no men suitable. The committee and the management appear to have met the situation with much forbearance and tact. They at once offered to meet a deputation from the women employees, and to give consideration to any points submitted. A special meeting of the Committee was accordingly arranged on Friday last, at which the General Manager was present. After hearing the statement of the deputation the Committee readily agreed, whilst re-affirming their previous resolution, that if suitable men could be found they should be appointed as inspectors. At a subsequent meeting with the General Manager, some ten names were submitted by the employees for consideration, and it was agreed that if any were found suitable by the Manager they should be appointed, as there were still a number of vacancies. Only one candidate was found to be eligible. In the meantime the women inspectors had continued their work, and the settlement having been approved, they are experiencing no further difficulty in carrying out their duties. The incident may be of some importance to other authorities as illustrating the happy effect of a readiness on the part of a committee and officials to consider representations from the employees in regard to conditions of employment. Undoubtedly much trouble could be avoided if in cases where changes are necessitated a full explanation were made to the employees as early as possible. It is not suggested that the permission of employees should be regarded as a necessary preliminary to a change; but no harm, and frequently much good, would result if the management would take their employees into their confidence and explain the reasons for changes which, without fuller knowledge, may seem to the employees uncalled for, and even irritating. The necessity for the utmost publicity regarding changes of practice is one of the principal recommendations which were made by nearly all the sections of the Committees on Industrial Unrest, whose reports have recently been issued as white papers.

GLASGOW TRAMWAYS' PROSPERITY.

The fact that Glasgow Corporation tramway undertaking is now free of capital indebtedness has attracted the attention of some of the financial and general engineering journals, and much praise is bestowed on the management and direction. Under the heading of "A Record of Success in Municipal Tramways," *Engineering*, on Friday last, devoted a leader to the Glasgow accounts, and to the reasons for the enormous financial success which has been achieved. In dealing with reasons, the journal points out that there are no tube railways, and the suburban lines of the railway companies are not operated electrically. Moreover, the street paving is not suitable for motor omnibuses; in any case the Corporation have prohibited the working of these. The cab traffic is limited, partly owing to the rate being 1s. per mile. The tramways traverse nearly all the main thoroughfares, and a passenger in the city area need not walk more than 100 or 200 yards to get a car. Apart from these and other things, it is admitted that the fares are commendable. Analysing the favourable traffic receipts, *Engineering* gives the opinion that they are due to the relatively small competitive transport facilities provided. On the other hand, credit is given for the relatively economical working expenses, and the conclusion is that Glasgow has every reason to be proud of the financial condition of the Corporation tramways.

The *Economist*, in dealing more briefly with the matter, adopts a whimsical vein. It says:—"The pathetic attempts of the Department to sweat down the amount of its profit which it hands over to what is known as the common good are worthy of study. Though the sinking fund amounts to £3,612,838, and equals the total capital expenditure, it is increased by the transfer of £114,378. The depreciation fund receives £34,049 and the permanent-way renewals fund £39,255. After paying income-tax and interest on capital (which is balanced by interest received on investments) and various odds and ends, the common good is presented with £160,985. We see hard times before the Tramways Committee of the Glasgow Corporation. When the war ends, the payments to dependents of employees cease, and cost of working decreases, all the ingenious financial camouflage of which Scottish administrators are capable will scarcely avail to hide these profits. Yet we would be prepared to back the Tramways Committee to put up a stiff fight to keep them concealed."

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WOMEN INSPECTORS EMPLOYED AT LEEDS.

SETTLEMENT OF THE DISPUTE.

As intimated in our last issue, the Leeds Tramways Committee met on Friday, August 10, to consider the protest raised by the women conductors against the employment of women inspectors. Alderman R. A. Smithson, chairman, presided, and all the members of the Committee were present, together with Mr. J. B. Hamilton, general manager, and Mr. A. Daggett, traffic superintendent. Mr. John Cliff, president of the Leeds branch of the Amalgamated Union of Tramway and Vehicle Workers, Mr. Harold Clay, secretary, were also present, and seven women represented the conductors. After a long sitting the following resolution, which was subsequently made public, was passed :—

> The Committee, having carefully considered the representations of the deputation, and being fully convinced of the necessity for the appointment of additional inspectors, are obliged in the present scarcity of suitable male labour to adhere to their previous resolution to appoint female inspectors. They will, however, endeavour to make appointments in the future, as in the past, when necessary, from men returned from active service, or any other male employees who may be found suitable. Should the decision of the Committee fail to meet the views of the employees, the Committee are quite prepared to agree to a joint application for arbitration.

This decision, and the reports of their representatives on the deputation—Mr. John Cliff and Mr. Harold Clay—were considered at a midnight meeting of employees on Saturday, when the following resolution was passed :—

> That having secured—(1)The appointment of all the available and suitable men in the service who were able to fulfil similar duties as inspectors to those proposed for female inspectors ; (2) an assurance that, in the future, appointments of ticket inspectors will be made from employees returning from active service if suitable for this work, but unfit for driving, or from any other suitable male employees ; (3) that no employee shall be penalised for any action connected with the dispute ; (4) that these appointments are a purely war measure—we hereby agree, subject to the provisions outlined above, to discontinue the policy declared by our resolution of the 4th inst.

In communicating this decision to the Tramways Committee, the officials of the union added :—" The situation now existing still requires careful handling and the utmost toleration on the part of the authorities if disaffection is to be avoided. During the dispute both parties have faced the issue with considerable frankness, and as a result certain misunderstandings that obtained have been removed. The continuation of the above policy will tend to a better understanding being maintained on the part of all concerned."

The Tramways Committee, in a statement of their position, say that, before considering the appointment of women inspectors, the Committee and management carefully examined all male conductors in the service as to their suitability for appointment to the full duties " At the meetings on Friday, the representatives of the union brought forward the names of several conductors who had a considerable record of service, and suggested that if these men could be appointed, although they were not able to perform the full duties of ticket inspectors, it would meet the position. This was agreed to, and it is possible that one or two of them will be selected for modified duties. Having regard to the very extraordinary increase in the number of passengers now being carried on the cars, and the consequent increase in the duties of conductors, it was decided by the Committee that if any of the present male staff could be selected as inspectors they were to be appointed, in addition to the women inspectors already appointed."

COMPRESSED GAS TRAMCARS.

In the report of the Executive Committee of the British Commercial Gas Committee (which is referred to at length in the motor traffic section of our issue of August 16) there is a reference to the use of compressed gas on the Neath Council Tramways. The cars are fitted with 15 h.p. engines, having two cylinders, 8½ ins. by 10 ins., and running at 264 r.p.m. At the depot are two two-stage compressors, each separately belt-driven by a 6 h.p. gas engine. The second set is used as a standby. The compressors discharge into storage reservoirs holding the equivalent of 12,000 cubic feet of free gas compressed to about 200 lb. per square inch. These holders act as reservoirs from which supplies are drawn when a compressing plant is not running. Sufficient gas to drive one of the cars about six and a half miles is carried on the vehicle in three reservoirs, of which two are hung under the chassis—one at either end. These are 4ft. long and 1 ft. 9 ins. in diameter. The third measures 13½ ft. by 1⅛ ft. in diameter, and is placed under one of the inside seats, balancing the weight of the driving engine, which is arranged under the opposite seat. The cost of the compressed gas is 3s. 4d. per thousand cubic feet. Seventy cubic feet per mile are used for oraction and 8 cubic feet for compression, making a total fuel cost of 3·1d. per car-mile. The compression has no appreciably injurious effect on the heat value of the gas, decreasing it by less than 1 per cent., which is more than compensated for by the complete dehydration of the gas due to its concentration. From the centrally situated depot the longest out-and-home run is about five miles. There are several gradients, the severest being 1 in 27 for a distance of about half a mile.

MISCELLANEOUS NEWS AND NOTES.

Overhead Line Materials.—The Municipal Tramways Association has appointed a committee to consider the standardisation of overhead line materials.

Fares for Soldiers.—The Aberdeen Tramways Committee has been asked to consider and report upon the propriety of allowing the men in His Majesty's Forces to travel on the tramcars at half fares.

Newport (Mon.) Light Railway.—The Board of Trade have received from the Light Railway Commissioners for confirmation an order for the construction by the Corporation of a light railway to the Docks.

Accident at Exeter.—A tramcar proceeding down Fore Street on August 10th jumped the points below the Royal Oak Inn and mounted the footpath, running into a house on the southern side of the street. The rails in front of the house and the porch at the door were demolished. The car, however, sustained no material damage.

Trolley Standard Torn from Car.—An unusual accident recently occurred on a car of the Hastings Tramways Company. Proceeding from St. Leonards to Bexhill on August 8th, the trolley wheel caught in the overhead work, and the trolley standard was torn from the roof of the car. Several passengers were injured, one seriously.

Half-penny Fare Abolition at Sheffield.—Sir William Clegg, chairman of the Tramways Committee, has stated that the result of the abolition of the half-penny fare has so far proved satisfactory. For the four weeks ended July 22, 1916, the receipts were £43,238, as compared with £48,738 for the same period of this year, an increase of £5,500, or over £1,300 per week.

Tramway Wages at Birmingham.—The application of the employees of the Birmingham and Midland Tramways Joint Committee for an increase of a penny per hour in their wages is to be referred to arbitration. The matter affects the motormen and women conductors in the Black Country as well as those engaged in working omnibuses running out of Birmingham.

Edinburgh Men's Exemptions.—An appeal by the Edinburgh and District Tramway Company for the further exemption of 265 of their employees was heard by a local Tribunal on August 7th. Mr. Cox, the general manager, stated that every man taken meant a car off the streets. After hearing a number of cases, the Tribunal released one man, a fitter, and granted the others exemption till December 1st.

Threatened Strike of Railway Enginemen.—The Society of Locomotive Enginemen and Firemen recently formulated a demand for an eight-hour day and an increase in wages, and now there is a threat that they will strike. The National Union of Railwaymen were not consulted, and Mr. J. H. Thomas, M.P., protests against the movement as a breach of the truce. The labour leaders generally are opposed to the agitation.

Taxicab Whistling to Cease.—In the House of Commons on Monday the Home Secretary announced that he proposed to make an Order prohibiting whistling for cabs within the County of London. The whistling between 10 p.m. and 7 a.m. was prohibited by an Order which came into effect on August 21st, 1916, but the whistling during the day has become an unbearable nuisance, and the Home Secretary has rightly interpreted the feeling of the public in regard to it.

Glasgow Tramway Draw.—The first week's sale of tickets under the new scheme ended on Saturday night. The total amount received, £340, is naturally much less than the amount received in the weeks when there was a draw for a picture or a war savings certificate. The weekly amounts then ranged from £1,246 to £1,742. The holder of the winning ticket will have the privilege of dividing the sum collected among the list of forty war funds.

Dilution of Labour.—In the House of Commons on Wednesday in a discussion of the Munitions of War Bill, Mr. Churchill announced that the scheme for the dilution of labour in private works must be dropped in order to enable the Bill to be passed before the adjournment. He stated also that the leaving certificate would be abolished subject to certain safeguards, including the requirement of a week's notice, and a provision to prevent men from leaving munition for private work. Mr. Churchill's announcement was received with general approval, and the new clauses were agreed to.

Dartford Tramways.—At a meeting of the Bexley Town Council, a report by Mr. H. P. Stokes, electrical engineer and tramways manager, on the situation caused by the recent destruction by fire of the Dartford tramway depot, was approved. Mr. Stokes said the lessees of the Dartford tramways had asked for assistance, and he had put on a temporary service on August 8. He attended a meeting in London, and also met representatives of the lessees and Messrs. Vickers, and, subject to the Dartford Council's approval, he had arranged to take over the entire management of the Dartford tramways and to run the system in connection with their own for the next four weeks.

Newcastle Tramways Air Raid Warning.—The Newcastle City Council on Monday approved the plans for the use of the tramway cars as the most effective means of giving warning of air raids. In case of a raid at night, the current will be interrupted and restored after an interval of a minute, so that the driver would know that it was not an accidental failure of the current, but intentional, and it will then be finally cut off. In daylight, on receiving the signal—*i.e.*, the cutting off of the current—the motorman will hoist on the front of his car a red flag. The Lord Mayor, making a statement at the Council meeting on Monday, said that the scheme was a matter of precaution. They did not want anybody to be " panicky," but they were taking time by the forelock to prepare for any development that the enemy contemplated.

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Price of Current at Peterborough.—The Town Council has decided upon another increase of 10 per cent. in the price of electrical energy as from September 30, making a total addition on the pre-war rate of 20 per cent. Peterborough Electric Traction Company is to be notified that the rates paid by them are to be revised in three months' time.

Manchester Traffic Congestion.—The Special Committee of Manchester Corporation, who for a long time have been discussing plans for the relief of traffic congestion, have finished their work. Mr. J. M. McElroy, the tramway general manager, who has given much study to the question, was able to lay important considerations before the Committee. It is reported that the Committee are of opinion that new routes and additional termini are required to meet the growing passenger and merchandise traffic in the centre of the city. The members of the Committee suggest the widening of certain streets and the creation of new thoroughfares so as to relieve the tramway traffic on the southern and south-western sides of the city as well as the east and north-east sides. The idea of converting the site of the old Infirmary in Piccadilly into a network of tramlines has been abandoned. The Committee, however, propose that a portion of the site should be used as a tramway terminus. At the same time they acknowledge that it is the duty of the Old Infirmary Site Committee to prepare and submit to the City Council a scheme for dealing with the site.

Burnley Tramway Employees.—On Monday the Tramways Committee of Burnley Corporation met a deputation from the Tramway and Vehicle Workers' Association with the object of clearing up some points connected with the recent strike. The chief point raised by the representatives of the employees related to the training of learners as drivers and conductors and the part time employment of men of military age who are engaged in other occupations. The employees feared that men eligible for military service might be trained as tramway workers, thereby relieving others of military age already in the tramway service. It was proved, however, that the number of learners was barely sufficient to relieve those men of military age who are likely to be required at an early date. It was explained that the Committee were acting in accordance with a resolution of the Town Council of June, 1915, instructing the committees of the Corporation when filling vacancies or engaging employees during the period of the war not to engage anyone eligible for naval or military service. It was also pointed out that the Committee were employing discharged soldiers, when suitable, for tramway work. This was in accordance with a resolution of the Council passed in October, 1915, to the effect "that it be an instruction to the committees of the Corporation that employees who have received their discharge from the Army or Navy disabled be, wherever possible, employed in the department of the Corporation in which they were engaged previous to joining the Army or Navy." It is stated that the explanation of the committee appeared to be fully satisfactory to the deputation.

PERSONAL.

Mr. W. G. Snell, tramways manager at Perth, has been granted an increase of £25 per annum in salary.

Mr. John Barr has been appointed a director of Vickers, Ltd., in succession to Mr. A. Miller, who has resigned.

Mr. G. H. Lake has been appointed chief assistant-engineer in the electrical department of Derby Town Council.

Mr. W. E. Riley, architect of the London County Council, who would have retired in October next under the age limit, will retain his office until October, 1918.

Mr. W. P. Durtnall has received a commission as temporary lieutenant in the R.N.V.R. He will be engaged in special electrical engineering and research work.

Colour-Sergeant-Major R. Edwards, Yorkshire and Lancashire Regiment, who was a driver on the Rotherham Corporation tramcars, has been promoted to be Regimental-Sergeant-Major.

CONTRACTS AND ORDERS.

Magnetic Brakes.—The general manager of Sheffield Corporation tramways has sold to Rotherham Corporation five sets of second-hand magnetic brake fittings, taken from the cars recently purchased from the London County Council, at £10 per set.

Sheffield Town Council has accepted the tender of Dewhurst's Engineering Company, Ltd., and of the Stirling Boiler Company, each for 500 steel boiler tubes.

FINANCIAL REPORTS AND MEETINGS.

Mansfield and District Light Railway.—An interim dividend of 3 per cent. will be paid on the ordinary shares.

Fife Tramway, Light and Power Company.—A dividend of 6 per cent., less tax, will be paid on the preference shares.

Chatham and District Light Railway.—An interim dividend at the rate of 6 per cent. per annum (6s. per share) has been declared on the ordinary shares for the past half year.

Lanarkshire Tramways Company.—An interim dividend at the rate of 6¼ per cent. per annum, less tax, will be paid on the ordinary shares for the half-year ended June 30.

Lancashire Dynamo and Motor Company, Ltd.—A dividend of 2½ per cent, free of tax, has been declared, making 12½ per cent. for the year, the same as the rate paid for 1915.

Para Electric Tramways and Lighting Company, Ltd.—An interim dividend at the rate of 6 per cent. per annum (6s. per share) less tax, will be paid on the ordinary shares for the past half-year.

Blackpool and Fleetwood Tramroad Company.—An interim dividend of 4 per cent. per annum (4s. per share) on the ordinary shares, free of income tax, has been declared for the half year. A year ago the dividend was at the same rate.

Straker-Squire, Ltd.—The issue of 75,000 £1 ordinary shares recently made by this firm under sanction of the Treasury was largely over-subscribed. The total amount for which applications were received represented, in fact, the sum of £250,904.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended August 15 amounted to £57,592 an increase of £7,817 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to August 15 (nineteen and a half weeks) the total receipts were £1,087,695 an increase of £134,952 on the corresponding period of 1916.

Leicester Traffic Returns.—Some months ago Leicester Corporation tramways department ceased to publish their traffic returns. For some time past the *Leicester Daily Mercury* has from time to time expressed its dissatisfaction with the withholding of the returns from the ratepayers, and it has at length succeeded in obtaining unofficially a statement of the traffics for the past week, which shows that although the recent increase in fares has had the effect of reducing the number of passengers, the change has been financially beneficial.

Loss on the Accrington Tramways.—At the monthly meeting of Accrington Town Council, on Monday, Alderman Higham, alluding to the loss of £976 on the tramways during the past year, pointed out that no one could say what would happen in the future, but the receipts at present were indicative of a deficit during the next twelve months. The Electricity and Tramways Committee were unable to do anything in the way of economising either in the matter of wages or other items, and their only hope was in increased receipts in order to avoid a loss next year.

Kalgoorlie Electric Tramways.—At the ordinary meeting of this company in London on August 9, Mr. O. Wethered, who presided, said that the report contained little that was cheering. The period had been one of difficulty and anxiety, and they could not hope for improvement until after the end of the war. The mines, on which the prosperity of Kalgoorlie necessarily depended, were passing through a very trying time. The Chamber of Mines quarterly statement to June, 1916, showed that there were 1,331 fewer men employed on the mines than for the corresponding period for the year before. The men at Kalgoorlie were demanding higher wages with threats of strikes if their demands were not acceded to. The demands made on this company were such that they could not agree to them. A good many conferences took place, but the men declined the company's offer, and insisted upon their claims being decided by the court. The matter had not yet been dealt with, but there was no doubt that some of their demands would be granted. Unlike other businesses, it was not possible for the company to call on the public to share part of the extra expenses, and although the cost of every article used in the running and upkeep of the tramway might be doubled or trebled, the fares must remain the same, and, whatever the extra cost, the tramways must run according to schedule. The completion of the Trans-continental Railway might favourably affect the situation, but some good discovery of gold in the district would do far more. Meanwhile the directors were doing their best to reduce costs to the lowest figure. The report was adopted.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended August 4 give total receipts of £203,415, or £11,321 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £94 18s. 5d. per mile of single track, and last year at the rate of £89 12s. 9d., thus showing an increase for the week of £5 5s. 8d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.,
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash, Aug. 14, or previous	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	78⅜	78½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4¼	56/3	58/1½
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	45/-	45/7½
4%	4%	Do. 4% Deb.	100	91	69½	70
4½%	4½%	Do. 4½% Deb.	100	98½	72½	74
5%	5%	Do. 5% Deb.	100	96	67	67
—	—	Associated Omnibus Co., Ord. ..	5/-	3/32	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 5/32	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	89½	89½
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102	101½
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	2/-	2/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	11/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	72½	72½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19⅛	19⅛
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77⅞	77⅞
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	49½	49
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90	89½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	90½	90½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	28	28
6%	5%	Do. Pref. Ord.	100	106	30½	29
5%	5%	Do. 5% Cum. Pref. ..	100	103	47⅝	50½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	54½	53
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28	28
6%	6%	Do. 6% Cum. Part. Pref.	100	—	73½	73½
5%	5%	Do. 5% Deb.	100	92	76⅝	77
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	66½	66½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6 1/16	6 1/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/10½	81/10½
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74½	74¼
1/-*	1/-*	Cape Elec. Trams	1	11/16	10/8½	10/6
1/3	1/3	City of B. A. Trams	5	5½	83/9	81/10½
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	87
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	78	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
4/-	5/-	Dublin United Trams. Ord. ..	10	8	7¼	7¼
6/-	6/-	Do. 6% Pref.	10	12	10 7/16	10½
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	1/16	10/6	10/6
4½%	4½%	Do. 4½% Deb.	100	67½	52½	52½
4½d.	1/1½	Hong Kong Tramway	5/-	1/16	15/9	15/9
5%	5%	Do. 5% Deb.	100	87½	79¾	79¾
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44⅜	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	3/32	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co.	10	10½	9⅜	9⅜
5%	5%	Lancashire Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79¼	79¼
9d.*	9½d.*	Llandudno & Colwyn B. Ord. ..	1	—	15/-	15/-
—	1 d.	London & Sub. Traction Ord. ..	1	3/64	1/1½	1/1½
6d.	6d.	Do. 5% Pref.	1	3/64	5/7½	6/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	62	63
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	33½	33½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%	9⅜d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	63¼	63
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	70	70
5%	5%	Do. 5% Deb.	100	87	77	77
$1½	$1½	Mexico Trams. Common ..	$100	70	26	25
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	44	35½
6%	6%	Do. 6% Mt. Bds. ..	100	76	30½	30½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	92	92
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	3/32	19/9	19/9
9½d.*	9½d.*	New General Traction	1	3/32	7/3	7/3
6d.	8⅜d.	Northern Gen. Trans. Ord. ..	1	3/32	13/3⅜	13/3⅜
5/-	6/-*	Para Elec. Rlys. Ord.	5	4½	80/-	80/-
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	5/9
—	—	Pernambuco Tram. & Power Ord	1	—	5/9	5/9
—	—	Do. 7% Non. Cm. Part Pf.	1	—	11/9	11/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
7½d.*	8⅜d.*	Potteries Elec. Trac. Ord. ..	1	3/32	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	3/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	⅛	20/6	20/6
3/-	3/-	Rangoon Elec. Tram & Sup. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	85½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	77	77½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89⅜	80
5%	5%	Do. 5% Perp. Deb. ..	100	99½	76	76
8/-	12/-	Shanghai Elec. Cons.	10	13	13½	13½
—	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	51½
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	95⅛	95½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	93½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	60/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	67	67
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	½	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	½	86/3	86/3
4½%	4½%	Do. 4½% 1st Deb.	100	85½	80	80
—	—	Metropolitan Dist. Ord. ..	100	21⅜	15 1/16	15½
—	—	Undgd. Elec. Rys. of London ..	10	21⅜	33/-	31/3
		Do. "A"	1/-	3/32	5/3	5/6
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	101½	101⅛
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	101	101
6%	4%	Do. 6% In. Bonds Rd. ..	—	88½	82½	82

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Aug. 7	525	584	+ 59	18	8,073	+ 807
Aberdeen Corporation ..	Aug. 8	2,232	2,205	— 27	10	22,409	+ 2,906
Ayr Corporation ..	Aug. 11	773	724	— 48	13	7,808	+ 1,283
Belfast City	,, 10	6,160	6,633	+ 473	19	117,130	+ 9,592
Birkenhead Corporation ..	,, 12	1,700	2,155	+ 455	19½	34,638	+ 4,944
Birmingham Corporation ..	,, 11	17,390	18,249	+ 859	19	338,654	+ 22,726
do. Motor Omnibuses ..	,, 11	1,405	1,451	+ 46	19	18,052	— 1,066
Blackburn Corporation ..	,, 8	1,391	1,641	+ 250	19½	29,524	+ 4,150
Blackpool & Fleetwood ..	,, 11	2,652	2,672	+ 20	31	24,071	+ 170
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,538	+ 6,036
Bournemouth Corporation	Aug. 15	3,350	3,757	+ 407	19½	49,034	+ 4,915
Bradford Corporation ..	,, 11	7,294	8,608	+ 1,314	19	146,239	+ 13,934
Brighton Corporation ..	,, 12	2,093	2,561	+ 468	19½	26,049	+ 3,815
Bristol	,, 10	6,308	7,549	+ 1,241	31	168,650	+ 14,006
Burnley Corporation ..	,, 11	1,739	1,934	+ 195	..	..	..
Burton-on-Trent Cor. ..	,, 5	301	342	+ 41	18	5,320	+ 443
Bury Corporation ..	,, 12	1,561	1,836	+ 275	19½	32,289	+ 3,642
Chatham & District ..	,, 9	1,669	1,841	+ 172	32	40,672	+ 2,528
Cork Electric	,, 9	651	679	+ 28	32	17,097	+ 1,056
Croydon Corporation ..	..	..	..	..	..	..	..
Darlington Corporation ..	..	..	..	..	..	..	..
Derby Corporation ..	,, 11	1,347	1,561	+ 214	19	22,778	+ 662
Dublin and Lucan ..	June 15	179	198	+ 19	24	3,404	+ 396
Dublin United	Aug. 10	7,820	8,458	+ 638	32	210,614	+ 22,785
Dundee City	,, 8	1,573	1,489	— 84	12½	18,985	+ 1,766
East Ham Corporation ..	,, 11	1,450	1,599	+ 149	19	27,323	+ 1,801
Exeter Corporation ..	,, 10	512	538	+ 26	19	7,711	+ 65
Glasgow Corporation ..	,, 11	24,110	26,142	+ 2,032	10½	270,898	+ 30,539
Glossop (U.E. Sup. Co.) ..	July 28	161	173	+ 12	30	4,301	+ 256
Halifax Corporation ..	Aug. 7	2,674	2,897	+ 250	18⅔	46,342	+ 3,220
do. Motor Buses ..	,, 7	59	54	— 5	18⅔	835	— 74
Hastings and District ..	,, 12	2,082	2,381	+ 299	32	36,864	+ 5,917
Huddersfield Corporation	,, 11	3,357	3,849	+ 492	19	62,647	+ 5,273
Hull Corporation ..	,, 11	3,444	3,828	+ 384	19	64,152	+ 3,737
Ilford U.D. Council ..	,, 11	798	1,034	+ 236	19	14,773	+ 1,304
Ipswich Corporation ..	,, 11	675	1,127	+ 452	19	12,975	+ 2,328
Isle of Thanet	,, 11	1,023	713	— 310	45	13,302	— 1,364
Kilmarnock Corporation ..	,, 11	180	188	+ 8	12½	2,448	+ 184
Lanarkshire	,, 9	2,773	3,042	+ 269	32	85,822	+ 13,448
Lancashire United ..	,, 8	2,328	3,929	+ 1,601	32	71,454	+ 15,060
Leeds City	,, 11	11,232	12,579	+ 1,347	19	210,523	+ 21,564
Leith Corporation ..	,, 11	999	1,106	+ 107	12½	13,938	+ 2,517
Leyton U.D. Council ..	,, 9	2,121	2,270	+ 149	19	36,622	+ 4,125
Liverpool Corporation ..	,, 11	16,286	18,295	+ 2,009	31½	486,375	+ 41,592
Llandudno & Colwyn Bay	,, 3	643	628	— 15	35½	9,867	— 714
London County Council ..	,, 15	49,775	57,592	+ 7,817	19½	1,087,695	+ 134,952
Maidstone Corporation ..	,, 9	261	346	+ 85	19	4,624	+ 422
Manchester Corporation ..	,, 11	20,065	22,410	+ 2,345	19	389,172	+ 25,835
Nelson Corporation ..	,, 11	225	262	+ 37	19	4,489	+ 288
Newcastle-on-Tyne Cor. ..	,, 11	7,055	8,388	+ 1,333	19	146,810	+ 21,119
New St. Helens & Dist. ..	,, 8	1,661	2,465	+ 804	6	10,106	+ 3,132
Northampton Cor. ..	,, 10	928	1,167	+ 239	19	15,560	+ 1,974
Nottingham Corporation ..	,, 9	4,444	5,574	+ 1,130	19	81,658	+ 7,766
Oldham Corporation ..	,, 12	2,614	3,055	+ 441	20	56,998	+ 5,547
Portsmouth Corporation ..	,, 11	3,807	4,359	+ 552	..	..	..
Preston Corporation ..	,, 8	1,120	1,246	+ 126	18½	21,984	+ 1,499
Provincial	,, 11	3,309	3,870	+ 561	45	101,373	+ 728
Reading Corporation ..	,, 9	1,000	1,338	+ 338	18½	19,149	+ 3,240
Rhondda Tramways ..	,, 2	1,413	1,536	+ 123	31	44,574	+ 6,253
Rochdale Corporation ..	,, 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	,, 15	1,705	1,931	+ 226	19½	34,650	+ 5,193
Salford Corporation ..	,, 13	5,818	6,814	+ 995	19½	128,570	+ 20,047
Sheffield Corporation ..	,, 12	11,177	12,902	+ 1,725	20	236,046	+ 25,983
Southampton Cor. ..	,, 8	1,986	2,498	+ 512	18½	36,469	+ 499
Southend-on-Sea Cor. ..	,, 1	1,430	1,153	— 277	18	16,939	+ 1,157
South Shields Cor. ..	,, 11	1,019	1,231	+ 212	19	18,173	+ 2,233
Sunderland Corporation ..	,, 12	2,003	2,346	+ 343	19	34,682	+ 2,824
Sunderland District ..	,, 8	834	1,205	+ 371	41	28,622	+ 4,097
Swindon Corporation ..	,, 8	236	337	+ 101	16½	5,031	+ 1,274
Torquay Tramways ..	,, 2	837	832	— 5	31	17,557	+ 1,295
Tyneside Trys. & Trmrds ..	,, 1	807	918	+ 111	5	4,503	+ 963
Wallasey Corporation ..	,, 11	2,005	2,496	+ 491	10½	31,078	+ 3,565
Walsall Corporation ..	,, 11	1,050	1,436	+ 386	17	18,330	+ 2,095
Walthamstow U.D. Coun. ..	,, 11	1,584	1,686	+ 102	19	24,417	+ 2,672
Warrington Corporation	July 26	516	552	+ 36	17	3,726	+ 586
West Ham Corporation	Aug. 9	3,567	4,178	+ 611	18½	69,970	+ 7,550
Wigan Corporation ..	,, 9	1,996	2,425	+ 429	18	36,763	+ 4,683
Wolverhampton Cor. ..	..	..	..	..	..	..	..
Yorkshire (West Riding)	,, 12	2,192	3,186	+ 994	32	66,298	+ 10,892

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Aug. 12	£48,752	£51,017	32	£1,639,043	+ £12,413
Auckland .. (29 days)	June 30	21,705	23,593	52	282,694	+ 7,931
Ballarat and Bendigo ..	May 20	3,854	2,991	8	7,602	+ 21
Brazilian Traction (Mlrs.)	June	7,178,000	7,642,000	26	44,646,000	+ 3,467,000
Brisbane	July	32,880	32,720	30	226,315	— 915
British Columbia .. $	June	400,814	373,029	52	5,325,756	+ 262,642
Buenos Aires Lacroze ..	July	38,439	38,063	4	38,063	— 376
Burmah Tram. & Light Rs.	July	26,340	26,288	52	39,167	+ 29,082
Calcutta .. .. Rs.	Aug. 11	69,736	68,300	32	2,166,210	+ 15,779
Cape Town	May	..	15,867	21	84,829	..
Carthagena and Herrerias	July	2,371	5,763	30	29, 935	+ 11,195
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	July	2,220	1,183	52	21,509	— 3,861
Hong Kong	June 30	15,226	13,365	26	344,642	— 10,984
Kalgoorlie	Apr.	2,553	2,705	17	10,101	+ 585
La Plata	July	3,910	3,875	30	29,019	— 816
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	May	..	233,765	..	..	..
Madras .. (2 weeks) Rs.	July 15	34,007	36,083	28	444,499	+ 40,150
Manila .. .. $	May	53,900	61,500	..	..	..
Manaos .. .. Rs.	Apr.	..	160,545	..	..	..
Melbourne	Mar.	63,000	64,506	13	186,321	— 9,179
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	Aug. 12	3,140	3,878	31	113,818	+ 23,445
Peruvian .. .. $	July	835,430	975,000	4	975,000	+ 22,707
Port Elizabeth	May	..	3,494	21	19,877	..
Rangoon	July	4,357	4,783	30	34,403	+ 1,465
Shanghai .. .. $	June 13	21,817	21,968	..	..	..
Singapore .. .. $	June 23	12,742	12,455	25	326,593	+ 16,598
Toronto .. .. $	June	884,491	984,529	26	5,873,584	+ 538,385
Winnipeg	June	254,686	254,226	26	1,673,370	— 28,104

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THE

Tramway & Railway World

Vol. XLII. No. 10] LONDON, SATURDAY, AUGUST 25, 1917. [Established in 1892.

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

KETTERING URBAN DISTRICT COUNCIL.

Electricity Department.

The above Council invite Tenders for the supply and laying complete in stoneware troughing of 754 yards 0·6 sq. in. concentric lead-covered paper cable (600 volts) together with three-core pilot, feeder pillar, dividing boxes and switchboard instruments.

Copy of Specification and Form of Tender may be had on application to Mr. W. A. Walker, Electricity Works, Kettering. Tenders, endorsed "Tender for Feeder Cable," to be delivered to me on or before 12 o'clock noon on Tuesday, August 28, 1917.

The Council do not bind themselves to accept the lowest or any tender.

Council Offices, Kettering, August 10, 1917.

JOHN BOND, Clerk to the Council.

FOR SALE.

OLDHAM CORPORATION ELECTRICITY WORKS.

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The Oldham Corporation Electricity Committee offer for sale the following plant:—

2 Willans-Siemens 740 kw. Sets, shunt wound, 450-480 volts.

The plant is in good working condition, and can be seen by appointment.

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J. H. HALLSWORTH, Town Clerk.

Town Hall, Oldham.

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Wanted, Armature Winder (must be ineligible), accustomed to tramway armature repair and rewind. Good wages to right man.—Apply, stating age, wages, and experience, to G. H. BROWNE, A.M.I.E.E., Mexborough and Swinton Tramway Offices, Rawmarsh, Yorks.

WANTED.—Copies of the TRAMWAY AND RAILWAY WORLD of January 11, 1912; January 1 and 13, 1916; April 13, 1916; May 11, 1916; and October 9, 1916.—Reply to Box 12, The TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

UNIVERSITY OF BIRMINGHAM.

PRINCIPAL:
SIR OLIVER LODGE, M.Sc., D.Sc., LL.D., F.R.S.
VICE-PRINCIPAL:
DR. R. S. HEATH, M.A.

ENGINEERING DEPARTMENTS;

I.—MECHANICAL ENGINEERING.

CHANCE PROFESSOR: F. W. BIRSTALL, M.Sc., M.A. (Cantab), M. Inst. C.E., M. Inst. M.E.
LECTURER: R. C. PORTER, M.Sc. (Vict.), A.M. Inst. C.E.
DEMONSTRATOR: (Vacant).
LECTURER ON MACHINE DESIGN: F. J. BROSCOMB, M.Sc., A.M.I.M.E.
ASSISTANT LECTURER ON MACHINE DESIGN: W. G. WISHART, B.Sc.

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PROFESSOR: GISBERT KAPP, M.Sc., D.Eng., M. Inst. C.E., M. Inst. E.E.
LECTURERS: E. J. KIPPS, M.Sc., M. Inst. E.E., and THOMAS F. WALL, D.Sc. (Manch.), D.Eng. (L'pool), A.M. Inst. C.E., A.M. Inst. E.E.
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THE SESSION 1917-18 COMMENCES ON TUESDAY, OCTOBER 2ND, 1917.

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SCHOOL OF TECHNOLOGY

(UNIVERSITY OF MANCHESTER).

PRINCIPAL: J. C. M. GARNETT, M.A. (late Fellow of Trinity College, Cambridge).

The Session 1917–18 will open on 5th October. Matriculation and Entrance Examinations will be held in July and September.

The Prospectus, forwarded free on application, gives particulars of the courses leading to the Manchester University degrees in the Faculty of Technology, and of the provision for Advanced Study and Research in the following departments:—

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ELECTRICAL ENGINEERING,
SANITARY ENGINEERING (including Municipal Engineering),
THE CHEMICAL INDUSTRIES (including General Chemical Technology, Bleaching, Dyeing and Dyestuff Manufacture, Printing, Papermaking, Brewing, and Metallurgy),
THE TEXTILE INDUSTRIES,
PRINTING AND PHOTOGRAPHIC TECHNOLOGY,
MINING,
ARCHITECTURE.

Intending students may enroll for the Session 1917–18 from 1st August, 1917. Members of the University under 18 years of age are eligible for membership of the Officers Training Corps.

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can be obtained, post free, at the following rates:

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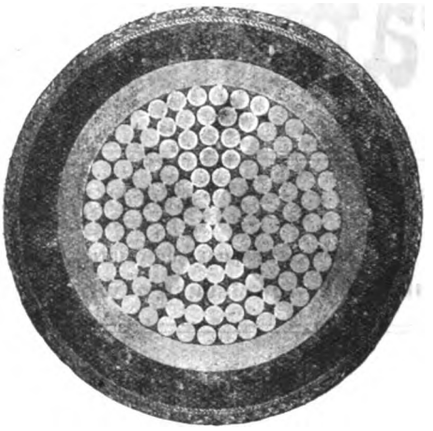

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THE
Tramway and Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, AUGUST 25, 1917.

THE SUPERFLUOUS STOPPING PLACE.

Long before the present war began, occasions arose which led us to point out that, without appreciable inconvenience to the public, the number of stopping places on many tramway routes might be reduced with material advantage to the undertakings. Only to a very limited extent was there any response to that suggestion. Of course there were objections, and in the days when there was no scarcity of labour, when wages were comparatively low, and when managers could better afford to spend money in pleasing the public without any particular financial return, it was not surprising that little or no reduction was made in the number of stopping places. Now all these conditions have changed. Men are scarce, cars are scarce because of increased traffic and difficulty of carrying out repairs, wages are high, and materials can hardly be got at any price. The time accordingly has come for reconsidering the question of stopping places. Every stoppage that a car makes means increased expense, both on account of the energy lost and the wear and tear involved in braking, and of the heavy current required in restarting and accelerating. Further, the fewer the stops, the higher the average speed of the car; and the higher that speed, the fewer cars are required to produce a given service. The fewer the cars, the fewer the number of drivers and conductors needed, and so comes a partial solution of the labour difficulty. If fewer cars are required, a longer time is available for the limited shop staffs to execute repairs. Conversely, if, as in munition areas, the number of cars available is insufficient for present requirements, the abolition of a number of stopping places is the equivalent to placing several more cars on the road. If on suburban routes the number of stopping places were cut down by, say, 50 per cent., and on busier routes the reduction were 25 per cent., the carrying capacity of the lines and the speed of the cars would be materially increased, and the working expense would be diminished. The only objection would be that people would frequently have to walk a little further before entering or after leaving a car. For that they would be compensated by having a quicker journey. Of course, any manager who contemplates a change of this kind would have to consider every route separately, and decide in the light of local circumstances what stops could best be eliminated. By observation it could be ascertained at what stopping places fewest people on the average left and entered cars. The change is at least worth a trial. Experiment would cost little trouble and practically no money, and if the old arrangement were found preferable it could as easily be reverted to. In the great majority of cases we believe that there would be no desire to revert to the existing arrangement. If even in peace times the reform is desirable, how much more desirable is it now as a valuable medium of economy in a world of high prices and scarcity.

EFFICIENCY AWARDS TO EMPLOYEES.

In discussing methods of securing greater efficiency the *Electric Railway Journal* (New York) makes the following interesting suggestions :—

In the past many plans for rewarding employees for better work have singled out only the highly skilled few, leaving the large majority discouraged over the prospect of ever attaining a first-class. For instance, where awards are made on the basis of records shown by energy-checking devices, it is not uncommon for the awards to go only to the top-notchers, whereas men who are several points lower, often because of conditions beyond their control, get nothing—and nothing in any event is also the reward which the majority receive. Quite a different method has been pursued by some railways in dividing accident savings among all the men, either by an equal division or on some seniority or wage basis. It is this plan, rather than individual bonuses, which has worked out successfully on a property equipped with coasting recorders. When these devices were installed, the management frankly told the men that certain savings could be accomplished if the men would help. No promise of any kind of award was offered, but when a year's operation had shown a most gratifying saving, the wages of every man were voluntarily advanced 1 cent an hour. The men were advised that this increase had been made possible only through their co-operation. The result was an immediate jump in coasting efficiency, and some plain talk to the low coasters by their fellow-motormen. While the example just quoted may appear unique of its kind, it shows that more may often be gained by interesting and rewarding the men as a whole than by restricting the bonuses to the few. The greatest gains to the railway must come from a high general average, rather than from a few star performances and many poor ones. If all are to be interested, all should be rewarded.

RAILWAYMEN'S UNREST.

The strike threatened last week by the Society of Locomotive Enginemen and Firemen has been averted by the men at length accepting the assurances given by Sir Albert Stanley, President of the Board of Trade. These were to the effect that the Government will retain control of the railways of the country for some time after the war is over, and that they will then sympathetically consider the demand of the locomotive men for an eight-hour day. The men's executive meantime are about to have a conference with the Railway Executive Committee in order to put forward arguments for a substantial increase in wages. It is also reported that the branches of the National Union of Railwaymen have been requested by the members to instruct the executive to give notice to terminate the "truce agreement" entered into in October, 1914. The object is to present a demand for a further 20s. a week increase of pay for all members of the union, male and female, and for a reduction of working hours.

The new scheme entered into by the Railway Executive Committee and the National Union of Railwaymen, by which the 15s. war bonus is converted into war wages, contains the following clauses :—

Such additional wages are to be regarded as a war advance intended to assist in meeting the increased cost of living, and are to be recognised as due to and dependent on the existence of the abnormal conditions now prevailing in consequence of war.

The truce entered into at the meeting between a Committee of General Managers and representatives of the two Trade Unions on October 1st, 1914, shall continue in force during the operation of this agreement or any modification thereof.

This agreement shall remain in operation during the war, and thereafter shall be subject to three months' notice in writing by either side. Provided that if at any time after the expiration of three months from the date hereof there shall be a substantial change in the abnormal conditions now prevailing it shall be open to either side to demand a revision of the additional wages set out above and the said wages shall be revised according to any agreement come to.

Tramways and Light Railways Association.—The Journal of the Association for August reproduces the awards of the Committee on Production for advances in tramway wages made during the past few months.

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SERIOUS ACCIDENT AT DOVER.

One of the most serious tramway accidents which has ever occurred in this country took place at Dover on August 12, resulting in eleven people being killed and a large number injured. A Corporation tramcar with about 50 passengers was on its way from Dover to River Village. When it was descending the steep gradient from Crabble Hill to the Athletic Ground, the car got out of control, left the rails, and dashed into a wall at the foot of the hill. The peril to the passengers was intensified by the car overturning after the collision. Some of the top deck passengers were violently thrown off, and all on board were severely cannoned about. Ten passengers were killed on the spot, and among the survivors were some who were very seriously injured. Among the killed were Councillor Joseph, of Folkestone; Mr. Axford, chief clerk of the Dover Electricity Department; and Miss Lettie Scrace, the conductor of the car. The driver (Brissenden) jumped at the last moment and escaped with minor injuries.

The Dover tramway system, though it possesses a good many gradients, has hitherto been immune from serious accidents. It began operation as long ago as 1897, and was the second municipal electric tramway to be opened in this country, the first being Leeds. The River branch of the system was an extension which came into public service in 1905. Great care has always been exercised in negotiating the steep gradient on this route, and the cars are provided with powerful brakes.

The Board of Trade inquiry was opened yesterday (Friday).

MISCELLANEOUS NEWS AND NOTES.

Rochdale Overhead Equipment.—The overhead equipment between Heybrook and Middlesbrough is to be renewed.

Brighton and Hove.—An extension for one year from August 7, 1917, has been granted by the Board of Trade for the completion of the overhead equipment of the Brighton, Hove and District railless system.

Cost of Tramway Cables.—Cable makers have advised the Edinburgh Tramway Company of a further increase of £12 per ton in the price of tramway cables, making a total increase in price since 1914 of 73 per cent.

More Use of Canals.—The Canal Control Committee urge manufacturers and others to use inland waterways for all kinds of traffic that can be so carried, in order to relieve the railways which are now so severely taxed.

Electricity Supply in Germany.—It is announced by the *Frankfurter Zeitung* that regulations are shortly to be issued restricting the supply of electrical energy in all parts of Germany, and consumers are advised to consider what economies they can effect.

Registration of Business Names.—It is announced that the offices of the Registrar of Business Names, 39, Russell Square, W.C.1, will be open to the public for inspection of documents filed and for the issue of certified copies of such documents from September 1.

Women Conductors on the South Shields tramway system have been provided with a novel style of uniform, consisting of long gaiters and a sort of semi-military three-quarter coat, which a local newspaper describes as giving the conductors quite a "smart appearance."

Sunday Cars at Rothesay.—A special meeting of the Town Council has been convened for September 3, to consider a communication from the Rothesay Tramways Company asking for powers to run cars on Sundays, to make a minimum charge of 2d., and to consider the annual payment for the upkeep of the roadway.

British Electrical Federation, Ltd.—The offices of the British Electrical Federation, at 1, Kingsway, W.C., having been commandeered by the Government, the Federation, the British Electric Traction Co., and its subsidiary companies, are now occupying premises at the Manchester Hotel, Aldersgate Street, London, E.C.

Damages Against Leicester Corporation.—In Leicester County Court Mrs. Sarah Mason has been awarded £43 damages against the Corporation in respect of personal injuries sustained when getting into a car which was set in motion suddenly without warning. The judge held that the conductor failed in his duty to see that the passengers were in a safe position when the car started.

The Channel Tunnel Still in Suspense.—In reply to a question in the House of Commons some days ago, Mr. Bonar Law announced that after consultation with their naval and military advisers, the Government were still of the opinion that it would not be practicable to proceed further into the matter until after the conclusion of the war, and under these circumstances it would not be possible for the Government to support the Bill.

A Tramway to Rosyth.—The project of constructing a tramway from Dumfermline to the naval base at Rosyth, on the Firth of Forth, has been agitated almost since the time when it first became apparent that this formerly lonely spot was going to become a great centre of population. Powers to instal a line in connection with the Dunfermline and District Tramways were obtained a few years ago, but little or nothing was done. It is now announced that Sir Eric Geddes, the new First Lord of the Admiralty, has decreed that the tramway must be constructed within a fixed period. As a result a conference of representatives of the parties interested was held in Edinburgh on August 17, and financial arrangements were concluded between the Admiralty and the Dunfermline and District Tramways Co. under which the necessary capital will be forthcoming. The work will involve road widening and improving of gradients. The distance from Dunfermline to Rosyth is about five miles.

Runaway Car at Nottingham.—On August 22 a well-filled car was descending a hill on the Bulwell-Trent Bridge route when it got out of control and quickly attained a high rate of speed. Several persons jumped from the car and were injured, but the car itself descended the incline without obstruction, and the driver managed to regain control before reaching a junction. The brakes were all found to be in perfect order and no definite cause for the occurrence can be discovered.

Gas Omnibuses at Oxford.—The Oxford Tramway Company have been able materially to improve their omnibus services by adapting some of the vehicles for the use of gas instead of petrol. This has enabled the manager, Mr. A. A. Tyler, to run a larger number of vehicles. The company's principal difficulty at the moment is the shortage of labour, and notice has been given that if more men are taken for military service, some of the services may have to be abandoned.

Car Drivers at Newcastle.—Newcastle Tramways Committee have released over forty men for the Army during this month, their places in the majority of cases having been filled by men of lower categories unfit for military service. About one hundred men, many of whom are said to be well-known professional business men in the city, are now engaged from 5 till 7 o'clock every morning in conveying workers to munition factories, and they also act as auxiliary drivers on Saturday afternoons.

Special Cars for Wounded Soldiers.—Bailie Buist, chairman of the Dundee Tramways Committee, in reply to a criticism that wounded soldiers were not at all times carried free on the cars, said that since the beginning of the war, with the co-operation of the hospital authorities, they had placed special cars at the disposal of wounded soldiers at any hour of the day. In addition, they supplied special celluloid tokens to be issued to wounded men as required, when special cars were not needed.

"Home Notes."—Readers of our contemporary, the *Indian and Eastern Engineer*, will notice the omission from the July issue of that popular feature "Home Notes." The explanation of their non-appearance is that the manuscript was lost in the s.s. *Mongolia* en route to Calcutta. It is the first time in twenty years that the writer of "Home Notes," who, by the way, is not unknown to tramway men, has failed to entertain his readers, and on this occasion the failure is clearly no fault of his, but must be attributed to the modern recrudescence of piracy.

Lease of the Hurst Tramways to Ashton.—At a meeting of the Tramways Committee of the Hurst Council with regard to the proposed new lease of the Hurst tramways, the terms proposed for the new lease of the tramways were stated. Hurst Council is to pay the cost of the renewals, and the Ashton Corporation to carry out the work and to pay the Hurst Council a sum of £60 towards the cost of such renewals. Hurst Council will pay either 5 per cent., or the average rate of interest on the capital expenditure of the undertaking, instead of 3½ per cent. under the present lease.

Railway Officials in Government Departments.—Mr. Bonar Law, in a Parliamentary reply to Mr. King, states: So far as it has been possible to ascertain, there are upwards of 30 railway officials of the rank of district officers and above who have been loaned by railway companies to Government Departments and continue to receive remuneration from railway funds instead of being paid from public funds. I am not aware that the matter has come before the Treasury, the Law Officers, the Comptroller and Auditor-General, or the Public Accounts Committee.

Privileged Passengers.—In spite of a recommendation to the contrary effect by the Tramways Committee, Huddersfield Town Council have decided to allow the clinical and nursing staffs of its war hospitals to travel free on the cars. Members of the Volunteer Corps can ride at half rates when in uniform going to and from drill. It was stated that the cars were carrying 11,000 wounded soldiers every week. Aberdeen Tramways Committee have agreed to abolish free tokens to nurses and soldiers on military duty, but to fix a maximum fare of ½d. all over for soldiers and sailors in uniform.

Lancashire and Cheshire Wages.—The employees of tramway undertakings in 13 towns in Lancashire and Cheshire are dissatisfied because the tramway authorities wish to refer a claim for an advance in pay of 7s. 6d. a week to all grades to the Committee on Production. The men's union want to negotiate with the tramway managers direct, and with that object they have withdrawn their application in order that it may be submitted in a different form. The award of an increase of 2s. 6d. per week recently granted brought the increase given since the war up to 9s. in the case of men and 6s. 6d. in the case of women.

Petrol Licences.—Owing to the urgent necessity for limiting the consumption of petrol to essential needs, the Petrol Controller has been unable to agree to the suggestion that the cancellation of out-of-date full-duty petrol licences should be confined to those held by motorists who relinquish their Inland Revenue vehicle licences on June 30. Permission has, however, been given by the department to the Automobile Association and Motor Union to submit for consideration on their merits, with a view to the issue of fresh licences, cases of holders of first and second issue full-duty petrol licences who have used their allowances sparingly and solely for business purposes, and who are now unable to obtain supplies for such purposes owing to the cancellation. The Controller emphasises that no undertaking can be given that new licenses will be issued in every case. Only those where there is satisfactory evidence that the petrol is really essential for business purposes are to be forwarded by the association.

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Steel Tires for Tram Cars.—With reference to the arrangement of the Committee on Manufactures in September, 1915, the secretary of the Tramways and Light Railways Association has informed members that the figures current for the last three months will hold good until September 30—*i.e.*, 40s. per cwt. net for driving tires, and 55s. cwt. net for pony tires.

Exeter Tramways Dispute.—An Industrial Commissioner expects shortly to visit Exeter to arbitrate between the Corporation Tramways Committee and the employees in respect of the application for over 20 per cent. advance in wages. It is stated that the employees have the support of the Trades and Labour Council, representing about 4,000 workers in various trade unions in the city, and the Exeter branch of the National Union of Railwaymen have passed the following resolution:—"That this meeting of the N.U.R., representing 1,000 citizens, protests against the long hours worked by, and low wages paid to, Exeter tramway employees, and calls upon the City Council to give substantial increases of wages upon a basis compatible with the present cost of living."

A Lanarkshire Accident.—In Hamilton Sheriff Court, Sheriff Sherman has issued his decision in an action brought by Mrs. Mary McNaughton against the Lanarkshire Tramway Company for £50 damages in respect of injuries received by her when she was about to board a car belonging to the defenders. It was stated, on her behalf, that she had one foot on the step of the car, when it started without warning, and she was thrown down. For the defenders, it was contended that the pursuer tried to board the car after it had started, and that in any event she had no right to board the car at the place in question as it was not a stopping place. The Sheriff found that the accident was not due to any fault on the part of the driver or conductor of the car, and decided the case in favour of the defenders.

Holiday Makers' Economy.—The increased railway fares are adding largely to tramway traffic receipts, especially on inter-urban lines. *The Yorkshire Observer* remarks that during the Halifax holidays the tramways brought large numbers of people from that town to Hebden Bridge on their way to the seaside. There was a continual procession of holiday makers carrying their luggage through the principal streets of Hebden Bridge, who were making their way to Sandbed, one and a half miles away, where they boarded the Todmorden motor omnibuses. By patronising the tramway cars and walking short distances between adjacent lines considerable saving in railway fares was effected. Local users of tramways complain that the cars were overcrowded by holiday traffic.

New Trade Commissioners.—The Civil Service Commissioners announce their intention to appoint a number of gentlemen to serve as Trade Commissioners in various parts of the Empire. Applications should be addressed in the first instance to the Secretary of the Civil Service Commission, London, W.1, and will be considered for submission to the Selection Committee, by which recommendations for appointment will be made to the President of the Board of Trade after interviews held in London. It should be understood that the most important qualifications for these appointments are a good knowledge of import and export trade and commercial experience at home and abroad. No applications from gentlemen unable to show these qualifications can receive consideration. Candidates should be under 50 years of age.

The Scarcity of Skilled Drivers.—An inquest was held at Whiston, Lancashire, on August 17, regarding the death of Thomas Bridge, a carter. It was stated in evidence that the deceased was driving a cart when a tramcar dashed into the cart from behind. Bridge died from the injuries he received. One witness said that the speed of the car was between 20 and 30 miles an hour and that the driver gave no warning of his approach. Another said that he was consulting a book when he crashed into the cart. G. E. Marsh, driver of the car, stated that he had been driving for a fortnight. He had previously been at the front, but had been discharged, and was formerly a conductor on the cars for three years. He was travelling at the rate of eight miles an hour. He first saw the wagon about 500 yards away, and thought it was turning off the track. He looked at his running board, and the next thing was he dashed into the wagon. Mr. T. S. Rayne, representative of the Tramway Co., said they could not put a proper service on, as all their eligible men had been called up, while others had volunteered, and they had the greatest difficulty in getting men. The jury returned a verdict of "Death from misadventure."

Women Drivers.—The adaptability of women as tramcar drivers was discussed recently before the Hull Military Tribunal, when three tramcar drivers claimed exemption. For the Army it was contended that women were employed as drivers in Glasgow, Doncaster and Cardiff, and were as efficient as men drivers. Mr. W. J. McCombe, the manager of the Hull Corporation tramways, on the other hand, said women were not employed on London tramways as drivers, and Paisley, a neighbour of Glasgow, spoke strongly against the employment of them. At Newcastle and Leicester they did not employ women, although they had tried them. From a medical point of view he did not think it was good for a woman to be in the position of having the responsibility for the safety of fifty or sixty passengers. Women were showing the strain as conductors all over the country, and in Hull they had much sickness. The secretary of the men's Union said that his experience of women had been that when it came to a sudden emergency their nerves would not stand the strain. They had had two cases in Manchester of women conductors who had fainted when the cars had collided with a passing vehicle. What would they do if they were on the footboard? The exemptions were granted.

Motors and Generators in Industrial Service.—The British Westinghouse Electric and Manufacturing Co. have issued an illustrated pamphlet which should be of great use in factories where electric power is employed, and especially in smaller shops where no one accustomed to dealing with electrical machinery may be regularly engaged. The book is called "British Westinghouse Motors and Generators in Industrial Service," and it gives explicit instructions on the installation, operation, care and repair of such electrical machinery. In the forefront is prominently put the importance of keeping the machine clean and dry. The instructions which follow begin with unpacking, and deal afterwards with foundations, erection, treatment of bearings, the making up of the electrical connections; and then come details as to care and maintenance in use. Both alternating and direct-current motors are dealt with.

Increase in Edinburgh Fares.—The fares were raised on Sunday last, the 1½d. fare becoming 2d., and the 2½d. fare 3d. Further alterations and increases will probably follow at an early date. The company explain that they have made strenuous efforts in the face of great difficulties to maintain the services and to avoid any increase in fares, but as the Corporation decline to reduce the rent they had no alternative but to increase fares. They point out that the impression that the company had in the past earned large profits was incorrect. The dividends paid since the inception of the company in 1894—*i.e.*, over a period of 23¼ years to date—averaged 7·63 per cent., and the total sum paid in dividends represented the sum of £165,875, or only £7,058 per annum, whereas the Corporation had received for rent and owners' rates and taxes and insurance to June 30 last the sum of £1,818,281. The increase is rendered necessary by the enhanced cost of material, increases in wages, the depletion of the car services entailed by so many drivers having been taken by the military authorities, and heavy charges on the company for rent, rates and taxes. The recent wage increase to employees represented a sum of £12,000 per annum. It is estimated that the additional expenditure for the year ending June 30, 1918, as compared with the year 1913, will be about £75,000.

Welfare Work at Sheffield.—A writer in the *Sheffield Daily Telegraph* remarks that Sheffield may be justly proud of its staff of women tramway employees. Starting with an experimental dozen, the numbers have now reached six hundred out of a total of just over a thousand. About three hundred wear the star which denotes one year's service. The Corporation pay these women on the principle of equal pay for equal work, and they have also taken special measures to secure the comfort of the employees. Sheffield Tramways Committee were among the first in this country to provide a club and canteen for their men, and an adjacent building has now been fitted up for the women. A staff of about eleven workers manage the clubs, which cost the Committee approximately £1,000 a year, or about £1 per employee per annum. As the general manager, Mr. A. R. Fearnley, puts it—"The club isn't a luxury, it's a necessity. We cannot turn one thousand employees loose in the centre of the city for meals and rest." The girls' club has an average attendance of 220 a day. Above the canteen is a large rest-room with a piano. The writer in the *Telegraph* pays a tribute to Mr. Fearnley, "whose broad-minded interest and careful attention to details in the welfare of the tramway employees is," he says, "no doubt largely responsible for the happy conditions which prevail."

PERSONAL.

Mr. J. A. Lycett, a member of the Council of the British Electrical Federation, has been appointed a magistrate for Staffordshire.

Mr. A. C. J. Charlier, of the Pearlite Steel Company, Ltd., Sheffield, has been elected the first president of the National Association of Industrial Chemists.

Mr. A. Hollinworth, who is at present in the employ of the Huddersfield Corporation, has been offered the post of electricity manager to the Holmfirth Urban District Council.

Sergeant S. Davey, who before joining the colours was a driver on the Rotherham Corporation cars, has been promoted to be Company-Sergeant-Major, Yorkshire and Lancashire Regiment.

Mr. E. Jordon, of the South Lancashire Tramways Company, has been presented by the engine-room staff with a wristlet watch on the event of his leaving the Company to join H.M. Forces.

Mr. F. H. Rudd has been recommended by the Rochdale Electricity Committee for the appointment as electrical engineer to the Corporation at a salary of £400 per annum, with an increment of £50 within twelve months.

Corporal James Blackhall, Cameron Highlanders, who has been awarded the Military Medal for bravery in the field, was, prior to joining the Army, in the employment of Glasgow Corporation tramway department.

Portsmouth Salaries.—Portsmouth Town Council have, on the recommendation of the Tramways Committee, agreed to increase the salary of the general manager, Mr. W. R. Spaven, from £500 to £550 per annum, and to £600 in a year's time, and to increase the salary of the engineer, Mr. V. G. Lironi from £400 to £450 per annum, and to £500 a year hence. Mr. Timpson, who moved the adoption of the proposals, mentioned that they were not made on account of the increased cost of living, but as just recognition for extra work well done. Owing to increased traffic extra work and extra responsibility had devolved on the manager and engineer.

Private J. W. Inchley, Cheshire Regiment, who has been killed in action, was in the employment of Leicester Corporation tramway department for twelve years before the war.

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FINANCIAL REPORTS AND MEETINGS.

Stewarts and Lloyds, Ltd.—An interim dividend has been declared for the half-year ended June 30 at the rate of 10 per cent.

Glasgow Subway Railway Company.—The directors announce an interim dividend at the rate of 2 per cent. per annum on the preference shares.

Millars' Timber and Trading Company.—The profits for 1916 were £48,164, and £50,811 was brought forward. Debenture interest and sinking fund charges absorbed £21,920, and the dividend on the preference shares for the half-year ended June 30, 1916, amounted to £25,500, leaving £36,537, which the directors propose to carry forward.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended August 22 amounted to £58,527, an increase of £8,779 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to August 22 (twenty and a half weeks) the total receipts were £1,146,260, an increase of £143,669 on the corresponding period of 1916.

Belfast Tramway Finance.—At a meeting of Belfast Tramways Committee, Mr. Moffet, the general manager, submitted a report on the revenue and expenses for the four months ended July 1. This showed the total revenue to be £108,204, as compared with £100,287, for the corresponding four months of last year. On the other hand, it was pointed out that additional expenditure had wiped out the increase in revenue, and had left a deficit, after allowing for all fixed charges, of £1,981.

Northampton Corporation Tramways.—The accounts for the year ended March 31 last show that the total revenue was £38,258, compared with £38,076 in the previous year. This is equal to 12·11d. per car mile, as against 11·7d. The working expenses came to £29,015 (9·16d. per car mile), compared with £24,130 (7·4d. per car mile). The increases in working expenses per car mile are mainly under the heads of general repairs and maintenance, and power expenses. After meeting capital charges and allowing £1,625 for the reserve fund, there is a deficit of £3,004. The passengers numbered 9,707,456, compared with 9,936,774.

Tyneside Tramways and Tramroads Company.—The half yearly report of the directors states that the surplus of receipts over expenses is £7,490, which, with the balance brought forward from last half-year of £664, makes a total to the credit of profit and loss account of £8,154, and after deducting interest on debentures, loans, etc., amounting to £1,012, there remains an available balance of £7,142. This profit the directors propose to appropriate as follows: In the payment of a dividend on the preference shares at the rate of 5 per cent. per annum (less income tax), £601; in the payment of a dividend on the ordinary shares at the rate of 4 per cent. per annum (less income tax), £2,678; in placing to the credit of reserve for renewals, depreciation and other contingencies, £1,000; (this, with £576 interest on investments, will increase the fund to £27,413; in placing to the credit of special reserve account, to meet contingencies, £1,000; in setting aside for the reduction of registration and formation expenses, etc., £389; leaving to be carried forward to next half-year, £1,474. The traffic receipts show an increase of £5,539, as compared with the corresponding period of last year.

CONTRACTS AND ORDERS.

Ferranti, Ltd., are to supply four single-phase 2085 k.v.a. transformers to Rotherham Corporation, and one 250 k.v.a. three-phase transformer to Salford Corporation.

Johannesburg Municipal Council have placed orders for copper rail bonds with the Western Electric Company of America, and for the supply of tramcar gear wheels with Hubert Davies and Company.

Glasgow Tramways Committee have recommended the acceptance of the following offers:—Traction lamps, Edison and Swan Electric Company and the General Electric Company; steel pinions, A. Wiseman, Ltd.; gear cases, Equipment and Engineering Company; special track work, Hadfields, Ltd.

Sheffield Electricity Committee recommend the City Council to accept an offer of the Ministry of Munitions with regard to the transference to Sheffield of a 28,000 kw. plant; to give instructions for the contracts to be placed for the necessary machinery, boilers, etc., at a total cost of £560,000; and to approve the expenditure of £448,000 of the sum named during the current financial year.

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Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended August 11, which included the August Bank holiday, give total receipts of £226,177, or £27,661 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £105 10s. 10d. per mile of single track, and last year at the rate of £92 12s. 8d., thus showing an increase for the week of £12 18s. 2d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

J. W. COURTENAY, LTD.
TRAMWAY AND OMNIBUS ADVERTISING CONTRACTORS,
are the Sole Contractors for

Liverpool Corporation Tramways
Edinburgh & District Tramways Company, Ltd.
Belfast City Tramways
Leeds City Tramways
Birmingham Corporation Tramways
Leicester Corporation Tramways
Nottingham Corporation Tramways
Portsdown & Horndean Light Railway Co.
Wakefield & District Light Railway
Londonderry Tramways Company
Calcutta Tramways Company, Ltd.
Cawnpore Electric Tramways
Delhi Electric Tramways
Mandalay Electric Tramways
Dover Corporation Tramways
Newcastle-on-Tyne Corporation Tramways
Cork Electric Tramways and Lighting Co., Ltd.
Isle of Thanet Electric Tramways Company, Ltd.
Keighley Corporation Tramways
Keighley Corporation Motor 'Buses
Burton-on-Trent Corporation Tramways
Scarborough Electric Tramways Co., Ltd.
Aberdeen Suburban Tramways Co.
Paisley & District Tramways Co.
Hastings & District Electric Tramways Co., Ltd.
Gosport and Fareham Tramways Co.
Doncaster Corporation Tramways
Cardiff Corporation Tramways
Plymouth Corporation Tramways
Gloucester Corporation Light Railways
Ilkeston Corporation Tramways
Stockport Corporation Tramways
Accrington Corporation Tramways
Ilford Council Tramways
Aberdeen Corporation Tramways
Bradford Corporation Tramways
Southampton Corporation Tramways
Halifax Corporation Tramways
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash Aug 23, or previous.	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	78¼	78¾
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4¾	56/3	56/3
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	45/-	45/-
4%	4%	Do. 4% Deb.	100	91	70	69½
4½%	4½%	Do. 4½% Deb.	100	98½	72¾	72½
5%	5%	Do. 5% Deb.	100	96	67½	67
—	—	Associated Omnibus Co., Ord. ..	5/-	3/32	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 5/32	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	89½	89½
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102	102
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	3/1½	2/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	3/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	72½	72½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19½	19½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	75	77⅜
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	47⅜	49½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	91½	90½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	90½	90½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	28½	28
6%	5%	Do. Pref. Ord.	100	106	30	30½
5%	5%	Do. 5% Cum. Pref. ..	100	103	45½	47⅜
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	54	54½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28	28
6%	6%	Do. 6% Cum. Part. Pref.	100	—	74	73⅜
5%	5%	Do. 5% Deb.	100	92	77	76⅜
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	66	66½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7¼	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/10½	81/10½
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74½	74½
1/-*	1/-*	Cape Elec. Trams	1	1/16	10/8½	10/8½
1/3	1/3	City of B. A. Trams	5	5½	86/3	83/9
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	78	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7¼	7¼
6/-	6/-	Do. 6% Pref.	10	12	10 3/16	10 3/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2⅜*	1/2⅜*	Do. 6% Cum. Pref. ..	1	3/16	10/6	10/6
4½%	4½%	Do. 4½% Deb.	100	67½	52½	52½
1/1½	5⅜d.	Hong Kong Tramway	5/-	5/16	15/9	15/9
5%	5%	Do. 5% Deb.	100	87½	79¾	79¾
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2¼	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44¾	44¾
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	3/32	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 13/32	9⅜
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79¾	79¾
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	5/32	1/-	1/1½
6d.	6d.	Do. 5% Pref.	1	5/16	5/6	5/7½
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61	62
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	80	81
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	36½	33½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%	9¾d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	63½	63½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	70	70
5%	5%	Do. 5% Deb.	100	87	77	77
$1½	$1½	Mexico Trams. Common ..	$100	70	26	26
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	46	44
6%	6%	Do. 6% Mt. Bds. ..	100	76	30½	30½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	92	92
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98¼	98¼
1/2⅜*	2/-	National Steam Car	1	5/32	19/3	19/9
9¾d.*	9¾d.*	New General Traction	1	3/32	7/3	7/3
6d.	8⅜d.	Northern Gen. Trans. Ord. ..	1	3/16	13/3⅜	13/3¾
5/-*	6/-*	Para Elec. Rlys. Ord.	5	4½	80/-	80/-
5%	5%	Do. 5% 1st Deb.	100	89½	74/1½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	5/10½	5/9
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/6	11/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80¾	80¾
7¾d.*	8⅜d.*	Potteries Elec. Trac. Ord. ..	1	1/16	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	1/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	¼	20/6	20/6
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	85½	85½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	76¾	77
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	80½	80⅜
5%	5%	Do. 5% Perp. Deb. ..	100	99½	79½	76
8/-	12/-	Shanghai Elec. Cons.	10	13	13¼	13¼
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	95⅛	95⅛
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	67
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅜	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	⅜	86/3	86/3
4½%	4½%	Do. 4½% 1st Deb.	100	85½	80	80
—	—	Metropolitan Dist. Ord. ..	100	21¾	14 33/39	15 3/16
—	—	Undgd. Elec. Rys. of London ..	10	21½	33/-	33/-
		Do. "A"	1/-	⅜	5/7½	5/3
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	101¼	101½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	103	101
6%	4%	Do. 6% In. Bonds Rd. ..	—	88½	82⅛	82½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	Latest Return. 1917	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917	Aggregate. Incr. or Dec.
Aberdare U.D.C. ..	Aug. 14	411	476	+ 65	19	8,549	+ 872
Aberdeen Corporation ..	„ 15	2,093	2,323	+ 230	11	24,732	+ 3,139
Ayr Corporation ..	„ 10	681	814	+ 133	14	8,622	+ 1,417
Belfast City	„ 17	5,374	6,410	+ 1,036	20	123,540	+ 10,628
Birkenhead Corporation	„ 19	1,642	1,961	+ 319	20½	36,599	+ 5,263
Birmingham Corporation	„ 18	16,643	18,103	+ 1,460	20	356,757	+ 24,187
do. Motor Omnibuses ..	„ 18	1,089	1,150	+ 61	20	19,202	— 1,006
Blackburn Corporation ..	„ 15	1,358	1,771	+ 413	20½	31,295	+ 4,520
Blackpool & Fleetwood ..	„ 18	2,678	2,603	— 75	32	26,675	+ 95
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corporation	Aug. 22	3,288	3,862	+ 574	20½	52,900	+ 2,493
Bradford Corporation ..	„ 11	7,294	8,608	+ 1,314	19	146,239	+ 13,934
Brighton Corporation ..	„ 19	1,942	2,216	+ 274	20½	30,826	+ 4,084
Bristol	„ 17	5,171	5,915	+ 744	32	174,565	+ 14,752
Burnley Corporation ..	„ 20	1,769	1,863	+ 94	..	..	..
Burton-on-Trent Cor. ..	„ 19	322	334	+ 12	20	6,050	+ 527
Bury Corporation ..	„ 19	1,558	2,041	+ 483	20½	34,330	+ 4,126
Chatham & District ..	„ 16	1,469	1,611	+ 142	33	42,283	+ 2,671
Cork Electric	„ 16	557	621	+ 64	33	17,719	+ 1,121
Derby Corporation ..	„ 18	1,282	1,319	+ 37	20	24,098	+ 700
Dublin United	„ 17	7,018	7,242	+ 224	33	217,856	+ 22,968
Dundee City	„ 8	1,573	1,489	— 84	12½	18,985	+ 1,766
East Ham Corporation ..	„ 18	1,373	1,482	+ 109	20	28,805	+ 1,910
Exeter Corporation ..	„ 17	485	456	— 29	20	8,167	+ 36
Glasgow Corporation ..	„ 18	23,638	25,902	+ 2,264	11½	296,800	+ 32,544
Glossop (U.E. Sup. Co.) ..	„ 18	154	176	+ 22	33	4,832	+ 327
Halifax Corporation ..	„ 14	2,875	3,418	+ 543	19½	49,760	+ 3,762
do. Motor Buses ..	„ 14	72	69	— 3	19½	904	— 77
Hastings and District ..	„ 19	1,930	2,089	+ 159	33	38,953	+ 6,082
Huddersfield Corporation	„ 18	3,387	3,784	+ 397	20	66,431	+ 5,670
Hull Corporation ..	„ 18	3,286	3,530	+ 243	20	67,683	+ 3,980
Ilford U.D. Council ..	„ 11	798	1,034	+ 236	19	14,773	+ 1,304
Ipswich Corporation ..	„ 18	614	845	+ 231	20	13,821	+ 2,550
Isle of Thanet ..	„ 18	1,002	574	— 428	46	13,876	— 1,793
Kilmarnock Corporation	„ 18	188	194	+ 6	13½	2,643	+ 191
Lanarkshire	„ 16	2,593	2,965	+ 372	33	88,787	+ 13,819
Lancashire United ..	„ 15	2,052	2,902	+ 850	33	74,357	+ 15,878
Leeds City	„ 18	10,491	11,312	+ 821	20	221,835	+ 22,433
Leith Corporation ..	„ 18	939	1,084	+ 145	13½	15,023	+ 2,663
Leyton U.D. Council ..	„ 16	1,869	1,981	+ 112	20	38,603	+ 4,237
Liverpool Corporation ..	„ 11	16,286	18,295	+ 2,009	31½	486,375	+ 41,592
Llandudno & Colwyn Bay	„ 17	878	836	— 42	37½	11,685	— 740
London County Council	„ 22	49,848	58,527	+ 8,779	20½	1,146,260	+ 143,669
Maidstone Corporation ..	„ 16	249	280	+ 31	20	4,905	+ 453
Manchester Corporation	„ 18	19,235	20,700	+ 1,465	20	409,872	+ 27,480
Nelson Corporation ..	„ 18	224	235	+ 11	20	4,724	+ 299
Newcastle-on-Tyne Cor.	„ 18	7,012	7,860	+ 848	20	154,704	+ 22,017
New St. Helens & Dist. ..	„ 15	1,369	1,750	+ 381	7	11,853	+ 3,452
Northampton Cor. ..	„ 17	758	852	+ 93	20	16,412	+ 2,068
Nottingham Corporation	„ 16	4,158	4,551	+ 393	20	86,210	+ 8,159
Oldham Corporation ..	„ 19	2,529	2,906	+ 376	21	59,904	+ 5,924
Portsmouth Corporation	„ 18	3,422	3,807	+ 385	..	..	..
Preston Corporation ..	„ 15	1,258	1,356	+ 98	19½	23,340	+ 1,597
Provincial	„ 18	2,989	3,173	+ 184	46	104,546	+ 913
Reading Corporation ..	„ 16	945	1,192	+ 247	19½	20,341	+ 3,486
Rhondda Tramways ..	„ 16	1,358	1,612	+ 254	33	48,291	+ 7,092
Rochdale Corporation ..	„ 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	„ 22	1,764	1,923	+ 159	20½	36,574	+ 5,352
Salford Corporation ..	„ 20	5,603	6,692	+ 1,089	20½	135,262	+ 21,135
Sheffield Corporation ..	„ 19	10,825	12,290	+ 1,465	21	248,336	+ 27,448
Southampton Cor. ..	„ 11	1, 39	2,277	+ 337	19½	38,746	+ 5 836
Southend-on-Sea Cor. ..	„ 1	1,430	1,153	— 277	18	16,989	+ 1,157
South Shields Cor. ..	„ 18	932	1,032	+ 100	20	19,206	+ 2,318
Sunderland Corporation.	„ 11	1,789	1,124	+ 135	20	36,606	+ 2 960
Sunderland District ..	„ 8	834	1,205	+ 371	41	28,622	+ 4,097
Swindon Corporation ..	„ 15	225	315	+ 79	19½	5,346	+ 1,954
Torquay Tramways ..	„ 16	1,018	1,105	+ 87	33	19,858	+ 1,526
Tyneside Trys. & Trmrds.	„ 8	867	1,267	+ 400	6	5,770	+ 1 383
Wallasey Corporation ..	„ 18	1 768	2,003	+ 235	20½	33.077	+ 3,799
Walsall Corporation ..	„ 11	1,050	1,436	+ 386	17	18,330	+ 2,095
Walthamstow U.D. Coun.	„ 11	1,584	1,686	+ 102	19	24,417	+ 2,672
Warrington Corporation	July 26	516	552	+ 36	17	3,726	+ 586
West Ham Corporation	Aug. 16	3,329	3,779	+ 450	19½	73,749	+ 8,000
Wigan Corporation ..	„ 16	1,6 6	2,005	+ 339	1	38,768	+ 5,023
Yorkshire (West Riding)	„ 19	1,903	2,374	+ 471	33	68,072	+ 11,363

The following Corporations and Companies have suspended the issue of Traffic Returns during the War :—

Accrington Corporation, Blackpool Corporation, British Electrical Federation, Cardiff Corporation, Chesterfield Corporation, Colne Corporation, Croydon Corporation, Dover Corporation, Glasgow Subway Co., Leicester Corporation, London General Omnibus Co., London United Tramways Co., Lowestoft Corporation, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.) Corporation, South Metropolitan Electric Tramways and Lighting Co.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	Latest Return. 1917	Aggregate. Wks.	Aggregate. 1917	Aggregate. Increase or Dec.
Anglo-Argentine	Aug. 19	£48,713	£50,140	33	£1,689,183	+ £13,840
Auckland .. (28 days)	July 27	21,507	21,799	4	21,799	+ 292
Ballarat and Bendigo ..	May 20	3,854	2,991	8	7,602	+ 21
Brazilian Traction (Mlrs.)	June	7,178,000	7,642,000	26	44,646,000	+ 3,467,000
Brisbane	July	32,880	32,720	30	226,315	— 915
British Columbia .. $	June	400,814	373,029	52	5,325,756	+ 262,642
Buenos Aires Lacroze ..	July	38,439	38,063	4	38,063	— 376
Burmah Tram. & Light Rs.	July	26,340	26,288	52	39,167	+ 29,082
Calcutta .. .. Rs.	Aug. 18	70,187	70,470	33	2,236,680	+ 16,062
Cape Town	July	..	16,067	..	..	..
Carthagena and Herrerias	July	2,371	5,763	30	29, 935	+ 11,195
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	July	2,220	1,183	52	21,509	— 3,861
Hong Kong	June 30	15,226	13,365	26	344,642	— 10,984
Kalgoorlie	Apr.	2,553	2,705	17	10,101	+ 585
La Plata	July	3,910	3,875	30	29,019	— 816
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	May	..	233,765	..	..	..
Madras .. (2 weeks) Rs.	Aug. 16	32,269	34,911	32	515,49	+ 46,565
Manila .. .. $	May	53,900	61,500	..	..	..
Manaos .. .. Rs.	May	..	158,613	..	..	..
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	Aug. 19	3,193	3,938	32	122,766	+ 24,190
Peruvian .. .. $	July	835,430	975,000	4	975,000	+ 22,707
Port Elizabeth	July	..	3,544	..	..	..
Rangoon	July	4,357	4,783	30	34,403	+ 1,465
Shanghai .. .. $	June 27	19,736	26,951	..	..	..
Singapore .. .. $	July 7	12,726	12,917	27	351,015	+ 16,142
Toronto .. .. $	June	884,491	984,529	26	5,873,584	+ 538,385
Winnipeg	June	254,686	254,226	26	1,673,370	— 28,104

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CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.
Patching—Partial repairs—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and Padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

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Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

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WEEKLY LIST OF TENDERS INVITED.

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(b) Laid complete on Site in Dublin.
(c) Troughing, Bends, and Covers delivered Fleet Street Stores, Dublin.
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(e) Section Pillars delivered Fleet Street, Dublin.
(f) Erection of Section Pillars on Site, Dublin.
(g) Service Boxes—4-core Distributors delivered Fleet Street Stores, Dublin.
(h) Service Boxes—Concentric Distributors delivered Fleet Street Stores, Dublin.

Specification, with General Conditions and Form of Tender, can be obtained from the CITY ELECTRICAL ENGINEER, Fleet Street, Dublin, on and after Tuesday, August 28, 1917, on payment of One Guinea, which will be returned on receipt of a bona-fide Tender.

Tenders, addressed "Chairman of the Electricity Supply Committee, Lord Edward Street, Dublin," and marked "Tender for Extra High-Pressure and Low-Pressure Cables," to be received not later than noon on Tuesday, September 11, 1917.

Tenders will be subject to ratification by the Municipal Council, who do not bind themselves to accept the lowest or any Tender, and reserve the right of accepting a Tender for any section or combination of sections separately, if found desirable.

FRED J. ALLAN,
Secretary.

Electricity Supply Committee's Offices,
Lord Edward Street, Dublin.
August 27, 1917.

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Town Clerk.

Town Hall, Oldham.

WANTED.—Copies of the TRAMWAY AND RAILWAY WORLD of January 11, 1912; January 1 and 13, 1916; April 13, 1916; May 11, 1916; and October 9, 1916.—Reply to Box 12, The TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

POSITIONS VACANT.

LONDON COUNTY COUNCIL.

Appointment of Charge Shift Engineer.

The Council invites applications for the position of Charge Shift Engineer at the tramways electricity generating station at East Greenwich at a commencing yearly salary of £250, rising by £10 a year to £300 a year.

Applications must be on the official form, which specifies the conditions upon which the appointment will be held. A stamped addressed foolscap envelope must be sent with the request for the form of application, which may be obtained from the Clerk of the Council, County Hall, Spring Gardens, S.W.1, and must be returned not later than 1 p.m. on September 24, 1917.

JAMES BIRD,
Clerk of the London County Council.

COUNTY BOROUGH OF DARLINGTON.

Assistant Mains Superintendent.

Applications are invited for a position of Assistant Mains Superintendent in the Darlington Corporation Electricity Department. Permanent appointment for suitable man. Salary, including war bonus, £2 15s. per week.

Applications, giving age and full particulars of experience, etc., and enclosing testimonials, should be sent to the Borough Electrical Engineer, Haughton Road, Darlington, not later than September 10, 1917.

H. G. STEAVENSON,
Town Clerk.

Town Clerk's Office, Darlington,
August 28, 1917.

SWITCHBOARD ATTENDANT.

Wanted immediately, Switchboard Attendant in certified undertaking, experience with 3-wire system with batteries; also Fitter-Driver, conversant with gas and Diesel engines, together with suction plants.—Apply, stating age, experience, particulars of exemption, etc., with copies of testimonials and wage required, to the undersigned.

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SATURDAY, SEPTEMBER 1, 1917.

ROUTE NUMBERS ON CARS.

A suggestion was lately made by a shareholder of the Dublin United Tramways Co. that route numbers should be used in place of lettered indicator boxes. The idea did not commend itself to Mr. W. M. Murphy, the chairman ; but all things considered, it is not difficult to show that the use of numerals is likely to facilitate identification of a car. Experienced tramway administrator as he is, Mr. Murphy did not hesitate to express the opinion that no advantage would accrue from changing the indicators with which people are familiar. Further, he doubted if even a policeman would remember numbers. Judging, however, by the readiness of the London constable in giving inquirers the route numbers of both cars and omnibuses, the latter part of the Dublin chairman's suggestion carries its own refutation. Doubtless he is ready to be convinced on the matter, for he admitted that the question is one on which a good deal can be said on both sides. In reviewing arguments for and against, one is met with the paucity of the objections. Almost the only point worthy of attention is in connection with the size of the numbers and the material of which they are manufactured. They need to be sufficiently large to permit of being seen without trouble by persons whose sight does not come up to the average. This constitutes the only objection that we have heard urged to the numerals on the London cars. It does not apply, however, to the omnibus numerals, doubtless because of the fact that a material other than glass is used for the latter vehicles. Possibly the crystals utilised on the tram cars were expected to give greater visibility at night, but at the outset of the restricted lighting edict, when destination boxes were not illumined, complaints were made concerning the lack of distinctness of the lighted figures. An improvement was effected by the use of a red inset. Useful as route numbers are they should, of course, not be allowed to supplant the indicator box or the side destination boards. Then, too, in order that numbers may be of the greatest utility, it is necessary that a time-table folder should be published, giving the numbers of the routes. This could be made to serve several purposes conducive to the prosperity of the undertaking From a traffic inducement point of view, this aspect could be emphasised to justify the introduction of route numbers in a town or district where there are but few routes. Again in large towns there are many persons who travel only on the route that takes them to office, shop, or works, but the introduction of numbers, and a folder suitably designed and worded, might be made to remind them of the existence of routes suitable for recreation purposes. Numbers also are valuable for effecting economy of space in newspaper advertisements, of which the London General Omnibus Co. and the Underground Group are the pioneers in this country. The position of the number on the vehicles requires some consideration. To place a numeral immediately over the lettered indicator does not facilitate prompt identification nor the changing of the number when a car is to run on another route. On top-covered cars it is impossible to find a more convenient position than that just below the centre of the glass front when that extends over the canopy ; in that place it is easy for the conductor to effect a change. On omnibuses the position just to the front of the canopy is generally selected. In the case of the onmibus, numerals are the more valuable because of the difficulty of lighting the wide expanse of the destination board on London vehicles. The majority of traction undertakings have not yet adopted route numbers, but doubtless greater progress would have been achieved if the war had not broken out.

THE ACCIDENT AT DOVER.

The Board of Trade inquiry into the Dover tramway accident, in which a car was overturned and 11 persons were killed and 59 injured, was held on August 24. The driver of the car, in the course of his evidence, admitted that he did not stop at the top of the hill according to the regulation, but said the reason was that his hand brakes failed to act, and the car gathered speed so quickly that the other brakes also failed. He claimed that the current was shut off, but other employees who inspected the wrecked car contradicted this. At the adjourned inquest on the accident, on August 27, witnesses spoke in high terms of the courage shown by Trooper Gunner, Dragoon Guards, who tried to stop the car. Both his feet were cut off when the accident occurred. An ex-coastguardsman, named Miller, who tried to help to stop the car, had one of his feet cut off. The manager said that in 20 years the Dover tramways had carried 60,000,000 passengers, and there had never before been a fatal accident to a passenger.

The coroner's jury on August 29 found that the accident was due to an error in judgment on the part of the driver, whom they considered was too inexperienced. It appeared that the driver was an invalided soldier and had been driving for only a few weeks.

INCREASE IN LONDON RAILWAY FARES.

From to-day certain local and through fares have been raised on the District, Metropolitan, London Electric, and Central London railways, the Great Northern and City, and the East London lines. No change will take place in fares where the recent 50 per cent. increase is already effective. In the majority of cases the increase of fares is either a halfpenny or a penny.

On the District Railway the penny fares remain unchanged, except on the section between the Mansion House and Charing Cross, where the new fare will be three-half-pence. On the Hampstead, Bakerloo, and the City and South London railways the local fares will not be changed, but certain increases will apply in the case of journeys involving a transfer.

The necessity for a revision of fares has arisen, it is stated, owing to the increased cost of maintenance and operation charges, which include the payment of a war bonus to the railway workers. It will be remembered that when the Railway Executive Committee raised fares by 50 per cent. the tube railways, which are not under Government control, retained their original fares.

In accordance with the notice given in July a revision of omnibus fares which then took place in the North-west area, has been extended to certain other motor omnibus routes.

Overhead Wire falls at Sheffield.—About one hundred yards of trolley wire in Abbeydale Road, Millhouses, was brought down recently by a falling tree.

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REMODELLED RAILS AT BOLTON.

On the invitation of the Woods-Gilbert Rail Grinding and Milling Company, a number of tramway committeemen, managers, engineers, and others interested, made an inspection on August 22 of the work now going on in Bolton, under the supervision of Mr. E. Ll. Morgan, borough engineer, remodelling the heads of worn rails by means of the machine with which the Company's name is associated. In our issue of August 16 last, particulars of this and of similar work elsewhere, were given. Two of the Woods-Gilbert machines are in use in Bolton, removing corrugations, deepening the grooves and repairing joints. As previously explained, a good deal of the Bolton track is due for renewal. Under war conditions new rails cannot be got, and it is expected that the remodelling of the existing rails will add several years to the life of the track.

The visitors were taken in special cars, provided by the courtesy of the tramway manager, Mr. J. Barnard, to Derby Street and Lostock, where the machines were at work, one being engaged in deepening the groove and the other in grinding the tread. After the demonstration the visitors were entertained to tea, when various speakers briefly expressed much satisfaction with what they had seen, and also their appreciation of the value of the process at a time when tramway authorities were getting into a state of desperation over the subject of track renewal. Councillor Higham, vice-chairman of Blackburn Corporation Tramways Committee, said that but for the machine tramway authorities would have had to take up some part of their tracks to obtain rails to repair other parts. Alderman Lindsay, chairman of the Salford Tramways Committee, and Councillor P. Higson, vice-chairman of the Bolton Tramways Committee, also spoke of the useful work that had been done in various towns. The Woods-Gilbert Company were thanked for having afforded the visitors the opportunity of seeing the machines at work. The company were represented by Messrs. J. Cameron, chairman, J. W. Eunson, engineer, and A. E. Conway, secretary.

TRAFFIC CONGESTION IN MANCHESTER.

NEW TRAMWAY ROUTES.

The question of the best means for relieving street traffic congestion in Manchester has been before the Corporation for several years. Some considerable time ago the Tramways Committee, the Watch Committee, and the Improvement Committee, acting on instructions, made separate investigations into the subject and presented reports. The Tramways Committee sent a deputation, including Mr. J. M. McElroy, the general manager, to America and to the Continent of Europe to examine traffic conditions in foreign cities. The Watch Committee also sent representatives to the Continent. After the three reports had been presented the Corporation appointed a Traffic Congestion Special Committee to consider the reports and make final recommendations to the Council.

The Special Committee have presented their report. In this they lay emphasis on the need for new trunk tramway routes and additional tramway termini. They also agree that Parliamentary powers should be obtained to enable the police more effectively to regulate street traffic. In regard to the Tramways Committee's proposal that a tramway terminus should be established on the old Infirmary site in Piccadilly, they say that a widening and lengthening of Parker Street would give all the room needed.

The Special Committee do not bind themselves to details, but give a list of proposed tramway routes.

Discussing future requirements, the Special Committee say that steps should be taken to provide additional arterial routes, giving quick and convenient access to the heart of the city. In considering the requirements for passenger transport they had in mind not simply the present form of surface transit—tramways—but the possibility of other forms of passenger transport being developed in the future. It should, however, be clearly understood that, whatever form of surface transit may come along, more street accommodation in the shape of new arterial routes is urgently required.

EMPLOYEES' DEMANDS.

The Birmingham branch of the Association of Tramway and Vehicle Workers have presented an application to the Tramways Committee, asking that the award of the Committee on Production of 3s. per week made on July 14 to the allied and engineering trades, be made applicable to tramway motormen and conductors. The application is based on increased cost of living.

Mr. T. Neafsey, district secretary of the Amalgamated Society of Tramway and Vehicle Workers, has given twenty-one days' notice to each of the nineteen Lancashire and Cheshire tramway authorities, in accordance with the provisions of the Munitions Act, that the whole of the members, male and female, will withdraw their labour unless their aplication for a further increase in wages is granted or referred to arbitration. On the same day, August 27, a further letter was sent to the tramway authorities making an application for 7s. 6d. a week advance for the whole of the members of 18 years and over, and 3s. 6d. per week for those under 18 years of age. There is also a demand for a war bonus of 1s. 6d. per week on a normal day's work, to be calculated on a week's work, and any overtime which the employees are called upon to work over and above the normal working day. Several tramway authorities have passed resolutions reiterating their opinion that it is inadvisable to negotiate separately.

MISCELLANEOUS NEWS AND NOTES.

Iron and Steel Institute.—The annual meeting will be held at the Institution of Civil Engineers, Great George Street, on Thursday and Friday, September 20 and 21, when a number of papers will be read and discussed.

Fares at Torquay.—Torquay Tramways Company propose to increase the 1d. fares to 1½d. from to-day. Other fares will remain the same as before. The change has been necessitated by the increased cost of working.

Tree Falls on Trolley Wires.—On August 24 a tree was blown down on the Wells Way at Bath. The falling tree brought down the tramway trolley wires and caused the service to Combe Down to be temporarily suspended.

Safety at Darlington.—To increase the safety of the principal streets at night during the approaching winter months, the tramway standards have been painted white, and electric lamps showing a subdued red light have been fixed to them.

Exeter Tramway Employees.—The trouble at Exeter is in a fair way to being adjusted. The manager has had a conference with the men, and has undertaken to make a recommendation as to pay, which the Tramways Committee will consider. The demand of the men for a uniform increase in wages of 20 per cent. will probably not be pressed.

Belfast's Electric Tower Wagon. The electrically-driven tower wagon, which was purchased in May, 1915, in place of a petrol-driven wagon, has enabled a material saving to be made in the cost of repair work and overhead equipment. The facilities for starting, stopping and manœuvring in traffic more than counter-balanced any lost time on the road, unless the journey was to a distant part of the city.

The Glasgow Tramway Drawing.—It will be remembered that when Glasgow Corporation found that it was illegal to carry on a fine art prize drawing scheme for the benefit of war charities, they substituted an arrangement under which the holders of certain tickets would be entitled to nominate the war fund to which certain proportions of the proceeds of the sales of the drawing tickets should go. The Lord Provost of Glasgow has now arranged to present each of the donors of the contributions with a handsome souvenir of the fund.

Ipswich Cars to be Painted Grey.—Mr. Frank Ayton, general manager and engineer of Ipswich Corporation Tramways, informs us that in order to save time and expense in the maintenance of the cars, and also in view of the frequent collisions between cars and other vehicles in the streets, owing to the absence of street lighting, the Corporation has decided that, for the remaining period of the war, the fancy painting of the cars shall be abandoned, and that, in place thereof, the cars shall be painted two shades of grey with a limited amount of black lining.

Municipal Tramways Association.—At a meeting of the Council of the Municipal Tramways Association in London yesterday, it was decided to recommend an alteration in the articles, enabling the Council to appoint a chairman to preside over their meetings. Hitherto the president of the Association has acted as chairman of the Council. When the president is a busy member of a Corporation, it is often impossible for him to attend all Council meetings, and the principal object in appointing a chairman of the Council is to relieve the president of routine work.

Standardisation of Overhead Line Material.—The following are the members of the sub-committee on Standardisation of Overhead Line Material recently appointed by the Municipal Tramways Association:—Mr. L. E. Harvey, tramways manager and engineer, Ilford; Mr. J. F. Simpson, borough electrical engineer and tramways manager, Preston; Mr. W. Boot, rolling-stock superintendent, Nottingham; Mr. H. Dudgeon, overhead line superintendent, Birmingham; Mr. Sturman, overhead line superintendent, Sheffield; and Mr. Weston, overhead line superintendent, Salford.

The Leeds-Bradford Tramway Service.—Local papers report the increasing popularity of the tramways service from Leeds to Bradford. This is provided by an arrangement for through running between the Bradford and Leeds Corporation tramways. The gauge of the two lines is different, Leeds tramways having a gauge of 4 ft. 8½ in. and the Bradford tramways 4 ft.; but some years ago an invention of Mr. C. J. Spencer, tramways manager of Bradford, was adopted for altering the gauge of the cars at the junction, and this has worked very satisfactorily. No doubt the increased railway fare is having the effect of causing people to make greater use of the tramway service between the two cities.

Revised Fares at Leicester.—The revised fares came into force on the Leicester Corporation tramways on August 20. In addition to the ordinary fares (introducing halfpenny stages on the outer portions of the routes) there will be a certain number of special fares, which are shown as follows:—Early return tickets, full distance (1½d. stage), 2d.; early return tickets, for any 1d. stage, 1½d.; outer transfer tickets, for any outer transfer stage, 2d.; inner transfer tickets, no alteration, 1½d.; children's tickets, no alteration, any 1½d. stage, 1d.; children's tickets, on halfpenny stages, same as adults, ½d.; soldiers' tickets, non-commissioned officers and men, no alteration, any 1½d. stage, ½d.; commissioned officers, ordinary fare. Outer return tickets are abolished. An experiment is being made in halfpenny fares on the outer zones only, the distance allowed being half a mile. The *Leicester Mail* remarks that it is greatly to be hoped the Tramways Committee will at once resume the publication of the weekly traffic returns, so that ratepayers can form their own opinion of the success of the new fares.

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A Little Cable Tramway for Sale.—Shipley Glen cable tramway, a short line on a steep gradient, which conveys sight seers to Shipley Glen, near Bradford, was offered for sale by auction on August 23. Bidding opened at £1,000 and rose to £1,500, at which figure the property was withdrawn. The line, which runs through a wood alongside the steep and rugged path used by pedestrians, was constructed over 20 years ago, and the lease of the land has still eight years to run. The average receipts for the last ten years were £728, and the net income is put at between £400 and £500. The fare has been a penny up the hill, and a halfpenny down. It is reported that during the whole existence of the tramway there has been no accident on it.

Remarkable Traffic at Leeds.—The *Yorkshire Evening News* says that the recent experience of the Leeds City Tramways is one of the local surprises among the war effects. Although the number of men who have left the city for active service runs well into five figures, the tramway traffic continues steadily to increase, and the tramways department is greatly handicapped by the shortage of drivers and repairers. Cars are always in the shed and motormen are continually in demand. Week by week the number of passengers increases, and it may be taken as certain that the receipts for the current financial year will form a record. Although last year the receipts reached the half million pounds for the first time, this year nearly half that record sum was taken in twenty weeks. The average receipts are over £1,000 a week more than last year, and in twenty weeks the receipts aggregated £220,000.

PERSONAL.

Mr. W. H. Ellis, a director of John Brown and Company, has been elected Master Cutler of Sheffield for the fourth year in succession.

Mr. J. Crowther, electrical engineer, of Wallasey, has been granted an increase in salary from £500 to £650 by annual increments of £25.

Dundee Town Council has granted a war bonus of 7½ per cent. on the salaries of the burgh engineer, the water engineer, and the tramways manager.

Signaller Sergeant F. Hall, formerly in the employment of the Blackpool, St. Annes and Lytham Tramways Company, is in hospital in France suffering from shrapnel wounds.

Lieut. E. Ivor David has been appointed Captain in the R.F.C. (Equipment Department). Captain David was formerly manager of the British Thomson-Houston Company in South Wales.

Company-Sergeant-Major R. Edwards, Yorkshire and Lancashire Regiment, who was a driver on the Rotherham Corporation tramcars, has been promoted to be Regimental-Sergeant-Major.

Messrs. Kincaid, Waller, Manville and Dawson have removed their offices to 3, Central Buildings, Westminster, S.W.1; St. Stephen's House, their previous address, having been requisitioned by the Government.

Southend-on-Sea Town Council, owing to the depletion of their staff, have found it impossible to allow the electrical engineer, Mr. R. Birkett, to serve two days per week for three or four months with the Coal Control Board.

Mr. Benjamin Hall Blyth, chairman of the Edinburgh and District Tramways Company, and consulting engineer to the Great North of Scotland Railway Company, whose death occurred on May 13 last, left personal estate valued at £31,311.

Mr. R. R. Greene, tramway manager of Wallasey Corporation Tramways, has been granted an increase in salary from £550 to £650 by four annual instalments of £25 each. The same increase, also by four instalments, was granted to Mr. J. H. Crowther, the electrical engineer, whose present salary is also £550.

Messrs. A. S. King and Company, of 28, Victoria Street, S.W.1, as announced in their advertisement in our issue of August 16, are specialising in electric vehicles. They point out that, owing to the high price of petrol, it is now possible to reduce running costs by the use of electric vehicles. A large number of these vehicles are now being acquired by Corporations for use in various departments of their work.

Mr. John Wardle, commercial manager of the Metropolitan Railway, has been appointed by Lord Rhondda to control cold storage and inland transport of food. Mr. Wardle studied the methods of the great American meat chilling companies during his visits to the United States. He commenced his railway career with the Lancashire and Yorkshire Railway in Manchester, and during ten years gained a large experience in railway and dock work. He then left Britain to take up a position with the Grand Trunk Railway of Canada. Returning to Britain, he became London traffic manager of the same railway, and in 1908 joined the Metropolitan Railway.

Private John Simpson, A.O.C., formerly a conductor in the employment of the Blackpool and Fleetwood Tramroad Company, has died of heat stroke in Mesopotamia.

Gunner Alex. Craig, R.F.A., for many years a driver on the Nelson, Blackpool and Burnley tramway systems, has been killed in action. One of his officers wrote testifying to the way in which he performed his duties, and described him as absolutely fearless.

Private J. W. Corcoran, King's Own Royal Lancashire Regiment, formerly on the staff of the Isle of Thanet Tramway Company, has also fallen. During his active service career he was three times wounded and twice gassed.

ORDER OF THE BRITISH EMPIRE.

The first list of appointments to the Order of the British Empire was issued on August 25. Among the names are the following:—

Knights Grand Cross.

The Right Hon. Sir Eric Geddes, K.C.B. Formerly Inspector-General of Transportation, Headquarters Staff, France. Now First Lord of the Admiralty.

The Hon. Arthur Stanley, C.V.O., C.B., M.P. Chairman of the British Red Cross Society and St. John of Jerusalem in England.

Knights Commander.

Herbert Austin, Esq., founder of the Austin Motor Company.

Dugald Clerk, Esq., past-president of the Institution of Automobile Engineers.

Cecil Partridge, Esq., manager and secretary, Metropolitan Munitions Committee.

Sir Vincent Litchfield Raven, deputy controller (Navy), late acting chief superintendent Royal Ordnance Factories, Woolwich.

Commanders.

A. Bellamy, Esq., President National Union of Railwaymen.

Harry Tempest Vane, Esq., managing director, D. Napier and Sons, Ltd.

Arthur Watson, Esq., member of the Railway Executive Committee.

Officers.

George Keith Buller Elphinstone, Esq., managing director of Elliott Bros., electrical instrument makers, Lewisham.

Walter Hudson, Esq., assistant secretary National Union of Railwaymen.

CONTRACTS AND ORDERS.

The J. G. Brill Company have received an order from Southend Town Council for castings and journal boxes.

Southend Highways Committee have recommended the purchase of four electric 2-ton "Orwell" vehicles, with electric tipping bodies and ironclad Exide batteries from Messrs. Ransomes, Sims and Jefferies, at a cost of £932 each. They have also recommended that application should be made to the L.G. Board for sanction to borrow for a term of five years £4,150 for the purchase of the vehicles, motor generator and necessary charging plant.

FINANCIAL REPORTS AND MEETINGS.

The Workington Iron and Steel Company, Ltd., have declared a dividend for the year ended June 30 last on the ordinary shares of 7 per cent., making 10 per cent. for the year, less tax, and the usual preference dividend. The rates are the same as a year ago.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended August 29 amounted to £57,679, an increase of £8,177 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to August 29 (twenty one and a half weeks) the total receipts were £1,203,926 an increase of £151,832 on the corresponding period of 1916.

Bolckow, Vaughan and Company.—The directors announce a further dividend of 8½ per cent., less income-tax, making the total return for the year 12 per cent. The corresponding payment a year ago was 8 per cent., and the year's dividend 11 per cent.

Mexican Tramways.—There has been a sharp rise in the price of the Mexican tramway shares during the week, the price having increased from 26 to 40½, owing to the improved political outlook in Mexico.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-one of the principal tramway undertakings in the United Kingdom for the week ended August 18 give total receipts of £195,363, or £20,618 more than in the corresponding week of last year. The total length of track included in the returns was 2,143 miles.

The receipts this year were at the rate of £91 3s. 3d. per mile of single track, and last year at the rate of £81 10s. 10d., thus showing an increase for the week of £9 12s. 5d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.,
ENGINEERS & CONTRACTORS.

Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash, Aug. 30, or previous	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	78½	78½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	60/-	56/3
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	45/-
4%	4%	Do. 4% Deb.	100	91	69	70
4½%	4½%	Do. 4½% Deb.	100	98½	72⅜	72⅜
5%	5%	Do. 5% Deb.	100	96	67½	67½
—	—	Associated Omnibus Co., Ord. ..	5/-	3/32	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 3/32	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	89¾	89¾
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102	102
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	3/1½	3/1½
6d.	6d.	Do. 5% Cum. Pref. ..	1	7/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	72½	72½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77¼	77¼
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19⅛	19⅛
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11¾	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	76	75
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	47½	47¾
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	91½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	90½	90½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27¾	28½
6%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	45½	45½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96⅞	55½	54
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	27½	28
6%	6%	Do. 6% Cum. Part. Pref.	100	—	73	74
5%	5%	Do. 5% Deb.	100	92	77	77
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	66	66
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	80/-	81/10½
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74½	74½
1/-*	1/-*	Cape Elec. Trams	1	11/16	10/8½	10/8½
1/3	1/3	City of B. A. Trams	5	5½	86/3	86/3
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	78	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7¼	7¼
6/-	6/-	Do. 6% Pref.	10	12	10 5/16	10 5/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2⅜*	1/2⅜*	Do. 6% Cum. Pref. ..	1	7/16	10/6	10/6
4½%	4½%	Do. 4½% Deb.	100	67½	50½	52½
1/1⅜	5⅜d.	Hong Kong Tramway	5/-	7/16	15/9	15/9
5%	5%	Do. 5% Deb. ..	100	87½	79¾	79¾
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	3/32	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 13/32	9 13/32
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79⅜	79⅜
9⅜d.*	9⅜d.*	Llandudno & Colwyn B. Ord. ..	1	—	15/-	15/-
—	1⅜d.	London & Sub. Traction Ord. ..	1	15/64	1/-	1/-
6d.	6d.	Do. 5% Pref.	1	5/16	5/9	5/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61	61
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	80	80
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	36¼	36¼
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7¼d.	9⅜d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1¼	$1¼	Manila Elec. R. R. & Light .	$100	102	63¼	63¼
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	70	70
5%	5%	Do. 5% Deb.	100	87	77	77
$1¾	$1¾	Mexico Trams. Common ..	$100	70	40½	26
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	50	46
6%	6%	Do. 6% Mt. Bds. ..	100	76	34½	30½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	92	92
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98¼	98¼
1/2⅝*	2/-	National Steam Car	1	13/32	19/3	19/3
9⅜d.*	9⅜d.*	New General Traction	1	½	7/3	7/3
6d.	8⅜d.	Northern Gen. Trans. Ord. ..	1	21/32	13/3¾	13/3¾
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	80/-	80/-
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74/5
—	—	Pernambuco Tram. & Power Ord	1	—	7/6	5/10⅗
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/6	12/6
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
7⅛d.*	8⅜d.*	Potteries Elec. Trac. Ord. ..	1	11/32	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	13/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	⅜	20/6	20/6
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	85½	85½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	77½	76⅝
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89⅝
5%	5%	Do. 5% Perp. Deb. ..	100	99½	75½	79⅛
8/-	12/-	Shanghai Elec. Cons.	10	13	13¼	13¼
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	95⅛	95⅛
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	½	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	¾	86/3	86/3
4½%	4½%	Do. 4½% 1st Deb.	100	85½	80	80
—	—	Metropolitan Dist. Ord. ..	100	21¾	15½	14⅞
—	—	Undgd. Elec. Rys. of London ..	10	21⅜	33/11½	33/-
		Do. "A"	1/-	⅜	5/9	5/7½
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	101¾	101⅝
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	103	103
6%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	84	82⅝

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Aug. 21	445	456	+ 11	20	9,006	+ 883
Aberdeen Corporation ..	,, 24	1,987	2,251	+ 264	12	26,983	+ 3,403
Ayr Corporation ..	,, 25	1,003	619	— 384	15	9,242	+ 1,032
Belfast City	,, 24	5,626	6,392	+ 766	21	129,932	+ 11,394
Birkenhead Corporation	,, 26	1,613	1,824	+ 211	21½	38,423	+ 5,474
Birmingham Corporation	,, 18	16,643	18,103	+ 1,460	20	356.757	+ 24,187
do. Motor Omnibuses ..	,, 18	1,089	1,150	+ 61	20	19,202	— 1,006
Blackburn Corporation ..	,, 22	1,335	1,568	+ 233	17⅞	32,863	+ 4,783
Blackpool & Fleetwood ..	,, 25	2,373	2,188	— 185	33	28,863	— 90
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corporation	Aug. 29	2,969	3,149	+ 180	21⅛	56,049	+ 2,674
Bradford Corporation ..	,, 18	7,923	8,924	+ 1,001	20	155,163	+ 14,935
Brighton Corporation ..	,, 19	1,942	2,216	+ 274	20½	30,826	+ 4,084
Bristol	,, 24	5,358	6,330	+ 972	33	180,895	+ 15,724
Burnley Corporation ..	,, 25	1,702	1,835	+ 133	..	..	..
Burton-on-Trent Cor. ..	,, 26	319	331	+ 12	21	71,655	+ 569
Bury Corporation ..	,, 26	1,564	1,806	+ 242	21½	36,137	+ 4,388
Chatham & District ..	,, 23	1,408	1,507	+ 9	34	43,790	+ 2,680
Cork Electric	,, 23	580	595	+ 15	34	18,314	+ 1,136
Derby Corporation ..	,, 25	1,287	1,284	— 3	21	25,382	+ 666
Dublin United	,, 24	7,074	7,099	+ 25	34	224,955	+ 23,058
Dundee City	,, 22	1,492	1,573	+ 81	14⅛	22,056	+ 1,803
East Ham Corporation ..	,, 25	1,416	1,508	+ 92	21	30,313	+ 2,013
Exeter Corporation ..	,, 24	475	456	— 19	21	8,623	+ 47
Glasgow Corporation ..	,, 25	20,766	25,907	+ 5,141	12⅞	322,707	+ 36,761
Glossop (U.E. Sup. Co.) ..	,, 25	143	176	+ 33	34	5,009	+ 570
Halifax Corporation ..	,, 21	2,753	3,165	+ 412	20⅞	52,925	+ 4,174
do. Motor Buses ..	,, 21	63	68	+ 5	20⅞	972	— 93
Hastings and District ..	,, 26	1,909	2,020	+ 111	34	40,973	+ 6,193
Huddersfield Corporation	,, 25	3,047	3,385	+ 338	21	69,816	+ 6,008
Hull Corporation ..	,, 25	3,157	3,478	+ 321	21	71,161	+ 4,301
Ilford U.D. Council ..	,, 11	798	1,034	+ 236	19	14,773	+ 1,314
Ipswich Corporation ..	,, 25	597	865	+ 268	21	14,687	+ 2,877
Isle of Thanet ..	,, 25	987	601	— 386	47	14,477	— 2,198
Kilmarnock Corporation	,, 25	188	195	+ 7	14½	2,838	+ 158
Lanarkshire	,, 23	2,631	2,963	+ 332	34	91,750	+ 14,151
Lancashire United ..	,, 22	2,036	2,805	+ 769	34	77,166	+ 16,608
Leeds City	,, 25	10,612	11,549	+ 937	21	233,385	+ 23,494
Leith Corporation ..	,, 25	900	1,033	+ 133	14½	16,056	+ 2,756
Leyton U.D. Council ..	,, 23	1,904	2,026	+ 122	21	40,629	+ 4,329
Liverpool Corporation ..	,, 25	15,107	16,289	+ 1,182	33⅔	519,321	+ 44,227
Llandudno & Colwyn Bay	,, 17	878	836	— 42	37½	11,685	— 740
London County Council	,, 29	49,502	57,679	+ 8,177	21½	1,203,926	+ 154,832
Maidstone Corporation ..	,, 23	242	277	+ 35	21	5,182	+ 488
Manchester Corporation	,, 25	19,575	21,463	+ 1,888	21	431.335	+ 29,240
Nelson Corporation ..	,, 25	214	230	+ 16	21	4,954	+ 316
Newcastle-on-Tyne Cor.	,, 25	7.030	8,042	+ 1,012	21	162,746	+ 23,046
New St. Helens & Dist. ..	,, 22	1.195	1,656	+ 461	8	13,508	+ 3,915
Northampton Cor. ..	,, 24	762	884	+ 122	21	17,296	+ 2,190
Nottingham Corporation	,, 23	4,213	4,619	+ 406	21	90,829	+ 8,564
Oldham Corporation ..	,, 26	2.788	3,286	+ 498	22	63,190	+ 6,423
Portsmouth Corporation	,, 25	3.592	3.834	+ 242	..	..	..
Preston Corporation ..	,, 22	1,177	1,256	+ 79	20⅓	24,597	+ 1,676
Provincial	,, 25	3,012	3,211	+ 199	47	107,758	+ 1,165
Reading Corporation ..	,, 23	991	1,182	+ 191	20⅔	21,524	+ 3,677
Rhondda Tramways ..	,, 23	1,456	1,532	+ 76	34	49,823	+ 7,168
Rochdale Corporation ..	,, 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	,, 29	1,740	1,864	+ 124	21⅓	38,439	+ 5,577
Salford Corporation ..	,, 27	5,660	6,584	+ 924	21⅔	141,846	+ 21,988
Sheffield Corporation ..	,, 26	11,150	12,468	+ 1,318	22	260,504	+ 28,766
Southampton Cor. ..	,, 22	1,969	2,294	+ 325	20⅓	41,040	+ 6,161
Southend-on-Sea Cor. ..	,, 1	1,430	1,153	— 277	18	16,939	+ 1,157
South Shields Cor. ..	,, 18	932	1,032	+ 100	20	19,206	+ 2,318
Sunderland Corporation.	,, 26	1,729	1,915	+ 186	21	38,522	+ 2 146
Sunderland District ..	,, 22	716	850	+ 134	43	30,372	+ 4,380
Swindon Corporation ..	,, 22	242	304	+ 62	20⅓	5,651	+ 1,416
Torquay Tramways ..	,, 23	1,132	1,065	— 67	34	20 923	+ 1 459
Tyneside Trys. & Trmrds.	,, 15	788	937	+ 149	7	6,707	+ 1 532
Wallasey Corporation	,, 25	1,719	1,981	+ 262	21⅓	35.058	+ 4,761
Walsall Corporation ..	,, 25	928	1,055	+ 127	21	20,350	+ 2,302
Walthamstow U.D. Coun.	,, 11	1,584	1,686	+ 102	19	24,417	+ 2,672
Warrington Corporation	July 26	516	552	+ 36	17	8,726	+ 586
West Ham Corporation	Aug. 23	3,375	3,835	+ 460	20⅔	77,584	+ 8,416
Wigan Corporation ..	,, 23	1,677	1,997	+ 320	20	40,765	+ 5,342
Yorkshire (West Riding)	,, 26	1,983	2,302	+ 319	34	70.974	+ 11,682

The following Corporations and Companies have suspended the issue of Traffic Returns during the War :—

Accrington Corporation, Blackpool Corporation, British Electrical Federation, Cardiff Corporation, Chesterfield Corporation, Colne Corporation, Croydon Corporation, Dover Corporation, Glasgow Subway Co., Leicester Corporation, London General Omnibus Co., London United Tramways Co., Lowestoft Corporation, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.) Corporation, South Metropolitan Electric Tramways and Lighting Co.

FOREICN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Decrease.
Anglo-Argentine	Aug. 26	£48,713	£49,469	34	£1,738,652	+ £14,596
Auckland .. (28 days)	July 27	21,507	21,799	4	21,799	+ 292
Ballarat and Bendigo ..	June 17	2,794	2,849	12	1,0451	+ 76
Brazilian Traction (Mlrs.)	June	7,178,000	7,642,000	26	44,646,000	+ 3,467,000
Brisbane	July	32,880	32,720	30	226,315	— 915
British Columbia .. $	June	400,814	373,029	52	5,325,756	+ 262,642
Buenos Aires Lacroze ..	July	38,439	38,063	4	38,063	— 376
Burmah Tram. & Light Rs.	July	26,340	26,288	52	39,167	+ 29,082
Calcutta .. .. Rs.	Aug. 25	69,100	69,485	34	2,305,965	+ 19,447
Cape Town	July	..	16,067	..	..	..
Carthagena and Herrerias	July	2,371	5,763	30	29, 935	+ 11,195
Cordoba	May	14,869	13,735	9	27,395	— 1,546
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	July	2,220	1,183	52	21,509	— 3,861
Hong Kong	June 30	15,226	13,365	26	344,642	— 10,984
Kalgoorlie	May	2,921	2,692	21	12,793	+ 356
La Plata	July	3,910	3,875	30	20,019	— 816
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	May	..	233,765	..	..	..
Madras .. (2 weeks) Rs.	Aug. 16	32,269	34,911	32	515,945	+ 46,765
Manila .. .. $	May	53,900	61,500	..	..	..
Manaos .. .. Rs.	May	..	158,613	..	..	..
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	Aug. 25	2,996	3,805	33	126,561	+ 24,999
Peruvian .. .. $	July	835,430	975,000	4	975,000	+ 22,707
Port Elizabeth	July	..	3,544	..	..	..
Rangoon	July	4,357	4,783	30	34,403	+ 1,465
Shanghai .. .. $	June 27	19,736	26,951	..	..	..
Singapore .. .. $	July 7	12,726	12,917	27	351,015	+ 16,142
Toronto .. .. $	June	884,491	984,529	26	5,873,584	+ 538,385
Winnipeg	June	254,686	254,226	26	1,673,370	— 28,104

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF ABERDEEN.

Tramway Department.

Uniform Clothing for Tramway Employees.

The Corporation of Aberdeen are prepared to receive Tenders for the Supply of Uniform Clothing and Caps for Inspectors, Motormen, Conductors (Male and Female), and Parcel Boys.

Forms of Tender may be had on application to the undersigned at the Tramways Office, Municipal Buildings, Aberdeen.

Tenders must be made on the Forms provided, and must be handed in not later than 12 o'clock noon on Tuesday, September 25, 1917.

The Corporation do not bind themselves to accept the lowest or any Tender.

The Contractors will be required to pay not less than the standard rate of wages relating to the particular trades to which the Specification applies.

R. STUART PILCHER,
General Manager.

Corporation Tramways Office,
Municipal Buildings,
Aberdeen, September 7, 1917.

POSITIONS VACANT.

LONDON COUNTY COUNCIL.

Appointment of Charge Shift Engineer.

The Council invites applications for the position of Charge Shift Engineer at the tramways electricity generating station at East Greenwich at a commencing yearly salary of £250, rising by £10 a year to £300 a year.

Applications must be on the official form, which specifies the conditions upon which the appointment will be held. A stamped addressed foolscap envelope must be sent with the request for the form of application, which may be obtained from the Clerk of the Council, County Hall, Spring Gardens, S.W.1, and must be returned not later than 1 p.m. on September 24, 1917.

JAMES BIRD,
Clerk of the London County Council.

FOR SALE.

ROCHDALE CORPORATION ELECTRICITY WORKS.

The Rochdale Corporation Electricity Committee offer for sale the following plant:—

One Belliss-Morcom-B.T.H. Co. 220-kw., three-phase, 3,000-volt, 50-period Steam Alternator.

The plant is in good working condition, and can be seen by appointment by applying to Mr. F. H. Rudd, Acting-Engineer and Manager, Electricity Works, Dane Street, Rochdale, from whom further particulars can also be obtained.

The Committee do not bind themselves to accept the highest or any Tender. Same endorsed "Electrical Plant" should be forwarded to

W. H. HICKSON,
Town Clerk.

Town Hall, Rochdale.

UNIVERSITY OF BIRMINGHAM.

PRINCIPAL:
SIR OLIVER LODGE, M.Sc., D.Sc., LL.D., F.R.S.
VICE-PRINCIPAL:
DR. R. S. HEATH, M.A.

ENGINEERING DEPARTMENTS;

I.—MECHANICAL ENGINEERING.
CHANCE PROFESSOR: F. W. BIRSTALL, M.Sc., M.A. (Cantab), M. Inst. C.E., M. Inst. M.E.
LECTURER: R. C. PORTER, M.Sc. (Vict.), A.M. Inst. C.E.
DEMONSTRATOR: (Vacant).
LECTURER ON MACHINE DESIGN: F. J. BROSCOMB, M.Sc., A.M.I.M.E.
ASSISTANT LECTURER ON MACHINE DESIGN: W. G. WISHART, B.Sc.

II.—CIVIL ENGINEERING.
BEALE PROFESSOR: FREDERICK C. LEA, M.Sc., D.Sc. (Lond.), A.M.I.C.E., A.R.C.S.
LECTURER: W. NORMAN THOMAS, M.Sc., A.M.I.C.E., A.M.I.M.E.
ASSISTANT LECTURERS AND DEMONSTRATORS: ROBERT C. PANTON, M.Sc., M.A., B.A.I., and P. M. CHADWICK, M.Sc., A.C.G.I.

III.—ELECTRICAL ENGINEERING.
PROFESSOR: GISBERT KAPP, M.Sc., D.Eng., M. Inst. C.E., M. Inst. E.E.
LECTURERS: E. J. KIPPS, M.Sc., M. Inst. E.E., and THOMAS F. WALL, D.Sc. (Manch.), D.Eng. (L'pool), A.M. Inst. C.E., A.M. Inst. E.E.
ASSISTANT LECTURER AND DEMONSTRATOR: (Vacant).

THE FULL COURSES EXTEND OVER FOUR YEARS, and students who enter after matriculation and pass successfully the examinations at the end of each year will BE ENTITLED TO THE DEGREE OF BACHELOR OF SCIENCE in Engineering.

THE SESSION 1917-18 COMMENCES ON TUESDAY, OCTOBER 2ND, 1917.

For detailed Syllabus, with full particulars of University Regulations, Lecture and Laboratory Courses, Fees, Scholarships, &c., apply to the SECRETARY.

SCHOOL OF TECHNOLOGY

(UNIVERSITY OF MANCHESTER).

PRINCIPAL: J. C. M. GARNETT, M.A. (late Fellow of Trinity College, Cambridge).

The Session 1917–18 will open on 5th October. Matriculation and Entrance Examinations will be held in July and September.

The Prospectus, forwarded free on application, gives particulars of the courses leading to the Manchester University degrees in the Faculty of Technology, and of the provision for Advanced Study and Research in the following departments:—

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ELECTRICAL ENGINEERING,
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THE TEXTILE INDUSTRIES,
PRINTING AND PHOTOGRAPHIC TECHNOLOGY,
MINING,
ARCHITECTURE.

Intending students may enroll for the Session 1917–18 from 1st August, 1917. Members of the University under 18 years of age are eligible for membership of the Officers Training Corps.

Electric Tramcar Handbook

FOR
MOTORMEN, INSPECTORS,
AND DEPOT WORKERS.

By W. A. AGNEW.

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THE
Tramway AND Railway World

Established in 1892 and Published by

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FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are illustrated numbers.
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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, SEPTEMBER 8, 1917.

TRACK MAINTENANCE IN WAR TIME.

This subject, which of course has been painfully acute in Great Britain for the last two or three years, is now beginning to be of importance also in the United States. The work of track maintenance in America is, of course, different from that in this country, because cross-sleeper construction is so extensively used, the T rail is still largely employed, and tracks are often laid in roads which are not paved. Still, a good deal remains that is common to track maintenance both here and in America. With a great rapidity since the United States entered the war the necessity has arisen for keeping down the manufacture and use of steel work and other things for civilian purposes, so that there may be the more available for war needs. The cost of material and of labour has gone up by leaps and bounds, so that there is almost if not quite as much need there for economy as there is here. These facts give special interest to a paper recently read before the Connecticut Society of Engineers by Mr. P. N. Wilson, of the Connecticut Company. It is to be gathered from his paper that Mr. Wilson is not familiar with the new method of planing, grinding, and milling the worn rail-head which is becoming so favourably known in this country, and which has been described in our pages. At least he does not refer to it, but he insists on the necessity of resorting to labour-saving machinery and new methods in order to keep down cost. He attaches great importance to the conservation of old rails in newly paved streets, instead of substituting new rails. If, however, the old rails are left, the condition of the joints is apt to give rise to trouble. Even if they are welded joints, the grinding necessary to remove depressions in the rail-ends would produce a sharp vertical curve in the surface. These cups would quickly cause loose joints. What Mr. Wilson recommends is the use of the arc-welding machine. By its employment cupped rail-ends may be built up, and then ground to a true surface, and so long as the rails remain tight, a good joint may be maintained. Innumerable repairs can also be made by welding on frogs, switches, curved rails, broken joints, etc. Some of the hints which the author gives as to re-laying track are suitable mainly for American conditions, but it is interesting to note that he is strongly in favour of welded joints, and of grinding all joints immediately after the track is laid. It is for sleeper track construction mainly that such things as pneumatic tie tampers, machine drills, and power shovels are recommended. On the whole, tramwaymen here will be interested in watching how the electric street railway men in America meet the problems of supplies, labour and finance as these become more difficult. As to finance, we recently noted that attempts are being made to obtain sanction for the raising of the uniform fare from five cents to six, but it is not yet clear to what extent the changes will be authorised.

GREAT RISE IN PETROL.

A sensation was produced on Monday by the publication of announcements that as from that date the price of petrol was increased by 8½d. a gallon. The Shell Marketing Company, sent out the following circular.—

"We regret to have to inform our customers that owing to the enhanced cost of ocean transportation, consequent on the great increase in the rates charged under the Government's War Risk Insurance, we are compelled as from Monday, September 3, to advance our prices to the extent of 8½d per gallon to meet the above-mentioned extra causes."

The Anglo-American Oil Company's circular ran.—

"Owing to the enhanced cost of petroleum products, and in particular to the advance in the cost of ocean transportation, consequent on the great increase in the rates charged for War Risk Insurance and other causes arising out of the war, the company are compelled, as from Monday, September 3, to advance their prices to a level which will help to meet the extra cost."

The former document refers to motor spirit and the latter to petroleum for fuel, lighting, etc.

While previous increases of price were due to the high cost in the countries of production, the present rise is attributed wholly or almost wholly to the new Government shipping insurance charges. It is in fact plain that the Government have struck a heavy blow at a great industry. In the middle of August the Government scheme of war risk insurance then in force way very considerably modified, with the result that while the position of the owners of requisitioned tonnage was improved, insurance rates for the so-called "free ships" were very substantially advanced. The total cost of war insurance for oil tank vessels, which, on the average, make about seven round voyages across the North Atlantic, is now admittedly very heavy. The charge falls particularly heavily on the shipowners because of the greatly enhanced values of tonnage. A new ship may cost between five or six times the amount of the pre-war value, and such increased values have naturally to be insured by the owners. According to some authorities, the rise in the insurance rate is form 4 per cent (the old figure) to 18 per cent. of the market value of the ship.

The ordinary retail price of petrol recently was about 3s. 4d. per gallon, and the increase brings it to about 4s. Under existing contracts, motor cabs in London were reported to be getting the spirit at 2s. 3d. per gallon or 2s. 6d. without the rebate of duty. Omnibuses were on a similar basis. An existing contracts run out higher prices will have to be paid. That will mean additions to fares. In the case of manufacturers, shopkeepers, and others, who use petrol vehicles for transporting goods and parcels, there will laso be an additional burden, but il will not be so severe as on those whose business is transportation alone.

TRAMWAY AND OMNIBUS ACCIDENTS.

On September 1 one of the cars of the London United Tramways Company was descending Kingston Hill, when it jumped the points, ran into the kerb, overturned, and was practically wrecked. Fortunately there was only one passenger —a nurse—and she escaped without serious injury. The driver was hurt, and the conductress was somewhat severely injured.

Late on the previous night a collision occurred between a London County Council tramcar and a motor omnibus on the hill between Streatham and Norbury. Both vehicles were damaged, and the car driver was severely injured.

On September 3 a collision took place between two Glasgow Corporation tramcars at Glasgow Cross. The accident occurred at a crossing owing to one of the cars taking a wrong turning. Seven passengers complained of slight injuries. The fronts of both cars were damaged.

On September 4 seven passengers were injured by an accident to a Hove motor omnibus which was on the way from Brighton to Portslade. The driver, to avoid a cyclist who was travelling in front of him, steered to the right. The cyclist turned in the same direction and was knocked down and seriously injured. The omnibus then struck the kerb with such force that the body parted from the chassis. The vehicle fell on its side, and brought down a tree with it. Some of the passengers were rather seriously injured, but the driver and conductress escaped unhurt.

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MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The complete programme of the annual conference of the Municipal Tramways Association, which will be held at Blackpool on September 20 and 21, is as follows :—

THURSDAY, SEPTEMBER 20.

10.45 a.m.— Meeting of the Executive Council.

11. 0 a.m.— Presidential address by Mr. Henry Mozley, general manager, Burnley Corporation Tramways.

Paper, "Notes on Tramway Finance," by Messrs. J. Barnard, general manager, Bolton Corporation Tramways, G. W. Holford, general manager, Salford Corporation Tramways, and P. Priestly, general manager, Oldham Corporation Tramways.

Discussion to be opened by Alderman C. F. Spencer, chairman, Halifax Corporation Tramways and Electricity Committee.

Discussion "Rule of Footpath."

Subject to be introduced by Mr. J. Dalrymple, general manager, Glasgow Corporation Tramways.

1. 0 p.m.— Interval.

2.15 p.m. Paper, "Differentiation in Fares for Workmen and other passengers on Tramways," by Mr. W. Murray, Assoc I.E.E., tramways manager, Walthamstow Urban District Council.

Discussion to be opened by Councillor J. Moon, deputy-chairman, Plymouth Corporation Tramways Committee.

Discussion—"Development of Tramways."

Subject to be introduced by Mr. Arthur Ellis, M.I.Mech.E., city electrical engineer and tramways manager, Cardiff.

FRIDAY, SEPTEMBER 21.

10. 0 a.m.— Meeting of the Executive Council.

10.30 a.m. Meeting of Managers' Section.

10.50 a.m.— Extraordinary General Meeting to confirm alterations to Articles of Association.

11 0 a.m.—Annual General Meeting.

The headquarters of the Association will be at the Savoy Hydro, North Shore, Blackpool, where the meetings will take place.

MISCELLANEOUS NEWS AND NOTES.

Extensions at Newport.—Good progress is being made with the extensions of the tramways to the Alexandra Docks, and the route is expected to be opened in a few weeks.

The British Thomson-Houston Company, Rugby, have issued list No. 3313, containing details of their truck type, iron-clad switch-gear type T, forms A and B, for polyphase systems up to 11,000 volts. The pamphlet consists of 20 pages, and includes half-tone illustrations and diagrams of connections.

Lancashire and Cheshire Managers' Association.—The Lancashire and Cheshire Tramway Managers' Association has been invited by the Blackburn Electricity and Tramways Committee to hold the November meeting at Blackpool, and the vice-chairman, Councillor Higham, and the tramways manager, Mr. J. H. Cowell, have been authorised to make the necessary arrangements.

London Cars in Newport.—A trial run was made on August 31 with one of the six cars which Newport (Mon.) Corporation have purchased from the London County Council. Owing to the lowness of some of the overhead railway bridges, these cars cannot at present be run on all the routes in Newport, but the roadway under the bridges is being lowered.

Bradford Men's Display.—The employees of Bradford Corporation Tramways have held a highly successful vegetable show. There were two sections, one for the produce of permanent gardens and the other for that of war-time allotments. The number of entries in the former was 132, and in the latter 131. Mr. E. Priestley, chairman of the Tramways Committee, opened the exhibition, and it was announced that all the vegetables shown would be sent to a local war hospital.

London School of Economics.—For the Session of 1917-18 very complete courses of lectures have been arranged on railway and cognate subjects. Among the expert lecturers is Sir George Gibb, who will open the courses by a lecture on the science of transportation. Technics, economics, and finance are all dealt with in the lectures which are to follow. As the School is a branch of the University of London, students may proceed to the B.Sc. degree with honours in Transport.

Lancashire Tramway Wages.—Representatives of the federated tramway authorities in Lancashire and Cheshire met in Manchester on August 31 to consider a request from the Association of Tramway and Vehicle Workers that each authority should receive a deputation from the men who asked for an advance in pay of 7s. 6d. per week per man. In the event of non-compliance with the request for interviews, the men would tender 21 days' notice to the 19 authorities concerned. Manchester was not represented at the meeting, as it had decided to submit the matter to the Committee on Production. The meeting resolved that the application of the employees should not be acceded to, and that the dispute should be referred to the Committee on Production for arbitration, the arbitration to be a joint one and to include all the authorities in Lancashire and Cheshire.

Trades Union Congress at Blackpool.—Mr. John Hill, in his presidential address on Monday, said that it would be their duty to see that the promises of the Minister of Munitions were carried out. The best scheme of reconstruction would be one of their own devising—a strong and intelligent trade unionism, linked into their political arm, the labour party. It was resolved to leave to the Parliamentary Committee the subject of locomotive engine men's and firemen's demand for an eight hour day.

Sydney City Railways.—The *Sydney Daily Telegraph* reports that the New South Wales Government has decided to discontinue the work on the construction of the city railway. It is stated that whatever loan money might be available in the near future for the railway department would be devoted to the construction of the rolling stock and the completion of such revenue earning-lines as had already been started. The *Sydney Morning Herald* states that in the first year of the war about seven millions had been expended on the project, and in the second year over eight millions, and in the third year about seven millions.

Wages in Newcastle.—The Tramways Committee have acceded to an application by the drivers and male conductors for an advance in wages of 3s. a week, so as to place them on an equality with engineers and others who have received a similar increase through the Committee on Production. Male conductors under 21 years of age were granted an advance of 2s. 6d. a week. The commencing wage of the female workers was increased by 1s. a week—from 25s. to 26s. This will be advanced by 1s. at the end of three months, and a further 1s. will be given at the end of six months' service, whilst at the end of twelve months they will be given a war bonus of 4s. per week.

Efficiency of Tramcar Life-guards.—At an inquiry into the death of a child who was killed by falling in front of a tramcar at Nottingham, it was stated that 15 people and several dogs had been picked up by the life-guards in Nottingham in the last twelve months. The evidence showed that the driver had no chance to release the guard before reaching the child, who ran straight on to the track and fell head foremost in front of the car. The coroner's jury returned a verdict of accidental death and exonerated the driver from all blame. It was stated on behalf of the Tramway Department that they did all they possibly could to avoid accidents, and that they would be helped if small children were kept under control on the busy roads.

Increased Costs at Coventry.—At a meeting of the Council on August 21, Councillor Wale, vice-chairman of the Tramways Committee, speaking with reference to fares, said that they aimed at providing a service as near cost as possible. They had to have regard to the concern paying its way, and he emphasised the fact that wages and the cost of material had increased very greatly, with the result that the gross profits were steadily diminishing. The Committee had passed a resolution to the effect that they had not men sufficient to give the service they would like, and the increased cost must be passed on to the public. The recruiting authorities appeared to look upon a tramway concern as a milch cow for providing recruits. Owing to increasing scarcity of labour, there was a probability of the Sunday services being discontinued. The Council granted the tramway employees an increase of a half-penny an hour as from April 1 last.

Rotherham Employees and the Army.—Before the South Yorkshire Appeal Tribunal in Sheffield, on September 1, the military representative appealed against exemptions granted by the local Tribunal in the cases of 17 employees of Rotherham Corporation Tramways. Fifteen of the men were drivers. It was stated on behalf of the Corporation that they were doing their best to get substitutes, as shown by the fact that they had arranged to release six of the 17 men as soon as substitutes were efficient. They had 30 substitutes sent down, but only 10 remained. The traffic manager informed the Chairman (the Earl of Wharncliffe) that it was not desirable to ulitise women as substitutes for motormen, as was done elsewhere, as the gradients of some of the routes were dangerous. Two of the men were ordered to join up, and others were given until November 30, but the Earl of Wharncliffe said the Tribunal felt strongly that all the men should eventually find their way to the colours. The exemption would not be made final, and the management had better do all it could to find substitutes, women or otherwise, as the prospect was that the men concerned would have to go.

Frauds on Tramway Undertakings.—At Glasgow Sheriff Court, an Italian named Andrew Valenti was sentenced to 15 months' imprisonment with hard labour and recommended for deportation thereafter. He admitted ten charges of fraud on tramway and other undertakings. The bodies defrauded included the tramway authorities of Paisley, Kilmarnock, Dumbarton, Musselburgh, and Falkirk, the North British and Caledonian Railway Companies, the Railway Passengers Assurance Company, and A. S. Barr and Co., Ltd., Glasgow. It was explained by the prosecution that prisoner, after receiving an injury, probably self-inflicted, and having procured a medical certificate, made a claim for damages. In each of the cases admitted he succeeded in getting compensation. The frauds covered a period from 1914 to 1916. For accused, it was stated that Valenti having received compensation for a legitimate injury while at work, this fraudulent scheme appeared to have occurred to him. Valenti could not write his own name or speak ten words of English, and how business men were imposed on by him was difficult to understand. The total of the sums he received was £71 16s., and probably about 25 per cent. of that amount would go in legal expenses.

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Southampton Tramway Employees as Gardeners.—The members of the Southampton Corporation Tramways Athletic and Social Club have devoted much time to the cultivation of gardens and allotments during this summer, and recently a show was held at the Portswood depot, at which there was a fine display of vegetables. This was the first event of the kind organised by the club, but it was thoroughly successful, and it is hoped that a similar show will be held each year. The movement was originated in order to encourage the many allotment holders among the tramway men, and the exhibits proved that the object had been fully attained. There were nearly 250 entries, and at the prize-giving in the evening speeches were made by Alderman Dunsford, Mrs Dunsford, Alderman Dacombe, Mr. W. T. Robson, the tramway manager, and others, in which warm appreciation was expressed of the good feeling existing between the employees and the management and committee. Many of the allotments cultivated by the exhibitors were originally dumping grounds for all kinds of rubbish, and the excellent result obtained is a striking testimony to the industry and persistence of the amateur gardeners. Provision was made for the encouragement of women conductors and boys, and it is interesting to note that one of the vegetable prize winners was a girl conductor, who had very successfully cultivated an allotment single-handed.

PERSONAL.

Councillor Peter Higson has been appointed chairman, and **Councillor J. R. Horrocks** vice chairman of the Bolton Tramways Committee.

Mr. R. S. Filcher, general manager of Aberdeen Corporation Tramways, has been recommended by the Tramways Committee for an increase of salary of £100, in two yearly instalments of £50.

Mr. George Salter, Chairman of George Salter and Co., Ltd., died on August 31, at Stourbridge, at the age of 61 years.

FINANCIAL REPORTS AND MEETINGS.

Leicester Tramways Committee have resolved to resume publication of their weekly traffic returns.

Newcastle-on-Tyne Electric Supply Company have declared an interim dividend of 2½ per cent. on the ordinary shares, less tax.

Madras Electric Tramways have declared an interim dividend on the ordinary shares for the half-year ended June 30 at the rate of 8 per cent. per annum.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended September 5 amounted to £59,227, an increase of £9,980 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to September 5 (twenty-two and a half weeks) the total receipts were £1,265,094, an increase of £161,752 on the corresponding period of 1916.

Tyneside Tramways and Tramroads Company.—Owing to the indisposition of the chairman, Dr. J. T. Merz, the vice-chairman, Mr. J. E. Henderson, presided at the half-yearly meeting of this company held on August 29. After giving a summary of the accounts, a statement of which was included in a previous issue, Mr. Henderson said the increased dividend on the ordinary shares at the rate of 4 per cent. compared with 1¾ per cent. paid previously. An increased amount was placed to reserve, and a larger sum was carried forward. In reply to a letter from a shareholder objecting that a larger dividend was not declared, the Chairman said that the times were not normal. Any increased traffic receipts which might be due to decreased railway facilities and increased fares should be considered abnormal, and the directors thought they would better keep a large sum in hand. A proposal to increase the remuneration of the directors, which had stood at £175 per annum since February, 1903, to £300 per annum, was adopted. A resolution authorising the directors to make a contribution of ten guineas to the Royal Infirmary, and to expend a sum not exceeding £200 on war charities in the half-year was also carried.

Newcastle Tramways.—At a meeting of Newcastle Tramways Committee on August 31, the financial statement on the working of the undertaking for the year ended March 31 last was submitted. It showed that the total revenue was £356,534, an increase of £31,840 over the preceding year. The traffic revenue was £346,334, and that from other sources £10,200. The traffic expenses were £103,300, an increase of £9,460, which was chiefly due to increased wages to the staff. Deducting the total working expenses, £208,299, from the gross receipts, there was available £148,236, to which was to be added £6,383 for interest on investments, and a refund of income-tax, leaving a gross profit of £154,619, representing 43·4 per cent. of the gross receipts. For the previous year the sum available was £132,046, to which was added £3,718 for interest on investments, etc., leaving a gross profit of £135,764. Owing to labour and materials being difficult to obtain, the repairs and renewals to the permanent way could not be carried out as formerly, and only £9,562 had been spent during the year, which was £11,490 less than in 1916. There was a balance to be carried to the reserve and renewal fund of £37,992, an increase of £14,132 compared with the previous year. Mr. R. Mayne, who presided, said it was satisfactory to note that in view of the heavy expenditure which would be required in the future, that they had now practically £106,000 in the reserve and renewal fund. The cost of renewals for some years to come would be considerably heavier than in pre-war times, and it would be advisable to appropriate the whole of the present year's surplus to that purpose.

Walter Scott, Ltd.—At the annual meeting of the shareholders of Walter Scott, Ltd., in Newcastle on August 29, Sir William Stephenson, who presided, moved the adoption of the directors' report, which showed profits of £127,000 and recommended a dividend of 15 per cent. He said that the company's steel works had remained "controlled," and the difficulties of working had been accentuated by the appointment of a Coal Controller, but the year was, perhaps, taken all round, the best since the company was formed 17 years ago. The steel works at Leeds had been fully employed, and while the output had not quite reached that of the previous year, the receipts had increased by over £200,000, although prices had been largely controlled by the Ministry of Munitions. After meeting extra costs and providing for taxation, they had been able to lay aside a large sum to meet future contingencies. They were now wholly engaged on Government work, and had a big order book, which would keep them fully employed for many months. With regard to the collieries, despite the demands for men for the Army, the output increased by the same amount as it was down in 1915-16 —25,000 tons — and the receipts increased considerably, while they had remunerative contracts for many months ahead.

Aberdeen Corporation Tramways.—The report of Mr. R. Stuart Pilcher, general manager of the Aberdeen Corporation Tramways, for the year ended May 31, 1917, shows that the total revenue amounted to £100,073, an increase of £5,745. The revenue reached the highest figure yet attained, and for the first time is over £100,000. The traffic has shown a steady increase throughout the year, and it has been at times as much as the department could handle with efficiency. Frequently the whole of the cars have been in service, and sometimes overcrowding had been inevitable. The working expenses were £64,026, an increase of £5,828. Considering the extra expenses include a large addition to miles run, the result is very satisfactory, the more so as it has not been obtained without an increase of fares. The net balance, after payment of interest and sinking fund, is £26,820, which has been appropriated as follows :— Depreciation and renewals, £13,912 ; special expenditure, £4,244 ; reserve account, £5,843 ; leaving £2,921 for disposal by the Corporation. There was an increase in mileage of 65,178, and an increase in energy consumed of 62,491 units. The average cost per unit was ·839d., as compared with ·841d. last year. The energy consumption averaged 1·251 units per car mile, as against 1·260 last year. Five women drivers have been trained during the year, and Mr. Pilcher thinks that if there is a greater shortage of men, no difficulty will be experienced in employing women for this class of work. The total number of regular employees who have joined H.M. Forces is 177, or 69·5 per cent. of the total male staff. On October 16, 1916, the wages of all employees over 18 years of age were raised one halfpenny per hour.

CONTRACTS AND ORDERS.

Babcock and Wilcox, Ltd., have an order from Manchester Corporation for superheater tubes for Bloom Street Electricity Works.

Salford Corporation has accepted the tender of Edison Accumulators, Ltd., for a 2-ton electric vehicle, with automatic electric tipping body, at £1,123.

The British Westinghouse Electric and Manufacturing Company are to supply a 300-kw. rotary converter set to Salford Corporation at £1,535, and switchgear at £551.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended August 25 give total receipts of £203,038, or £22,156 more than in the corresponding week of last year. The total length of track included in the returns was 2,040 miles.

The receipts this year were at the rate of £99 16s. 5d. per mile of single track, and last year at the rate of £88 19s. 2d., thus showing an increase for the week of £10 17s. 3d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

The Brush Electrical Engineering Company, Ltd., have removed their offices from 1, Kingsway to Maxwell House, 11, Arundel Street, London, W.C.2.

DICK, KERR & Co., Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.,
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDEN PREV.	DIVIDEN LA.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH SEPT. 6, or previous.	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	73½	78½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4½	61/10½	60/–
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69½	69
4½%	4½%	Do. 4½% Deb.	100	98½	72⅝	72⅝
5%	5%	Do. 5% Deb.	100	96	67½	67½
—	—	Associated Omnibus Co., Ord. ..	5/–	5/32	1/3	1/3
1/–	7d.	Auckland Elec. Trams. Ord. ..	1	1 5/32	23/–	23/–
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	89½
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	101½	102
—	1/–	Bath Electric Trams Pref. Ord.	1	¼	3/3	3/1½
6d.	6d.	Do. 5% Cum. Pref. ..	1	5/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	72½	72½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/–*	20/–*	Bombay Elec. Sup. & Tram Ord.	10	14	19½	19½
6/–	6/–	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	76	76
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	46⅜	47½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	92	90½
4/–	4/–	Brisbane Elec. Trams. Ord. ..	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	90½	90½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27½	27½
6%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	45½	45½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	53½	55½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28	27½
6%	6%	Do. 6% Cum. Part. Pref.	100	—	73½	73
5%	5%	Do. 5% Deb.	100	92	77	77
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	66	66
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/–	6/6*	Calcutta Tramways Ord. ..	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 5/16	81/3	80/–
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74½	74½
1/–*	1/–*	Cape Elec. Trams	1	1 1/16	10/8½	10/8½
1/3	1/3	City of B. A. Trams	5	5½	86/3	86/3
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	78	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/–	4/–	Dublin United Trams. Ord. ..	10	8	7¼	7¼
6/–	6/–	Do. 6% Pref.	10	12	10 5/16	10 5/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/–	1/16	1/3	1/3
1/2⅜*	1/2⅜*	Do. 6% Cum. Pref. ..	1	1/16	10/–	10/6
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5¾d.	Hong Kong Tramway	5/–	5/16	15/9	15/9
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/–	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 15/32	9 15/32
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9⅜d.*	9⅜d.*	Llandudno & Colwyn B. Ord.	1	—	15/–	15/–
—	1½d.	London & Sub. Traction Ord. ..	1	1/32	1/–	1/–
6d.	6d.	Do. 5% Pref.	1	5/16	5/8	5/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61	61
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	80
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	36⅜	36½
3/–	3/–	Madras Elec. 6% Pref. ..	5	5 1/16	85/–	85/–
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9⅜d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	63½	63½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	70
5%	5%	Do. 5% Deb.	100	87	80	77
—	—	Mexico Trams. Common ..	$100	70	40½	40½
—	—	Do. 1 Mt. 5% G.B. ..	—	84	49	50
—	—	Do. 6% Mt. Bds. ..	100	76	34½	34½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	92	92
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2⅜*	2/–	National Steam Car	1	15/32	19/–	19/3
9⅜d.*	9⅜d.*	New General Traction	1	½	7/3	7/3
6d.	8⅜d.	Northern Gen. Trans. Ord. ..	1	21/32	13/3⅜	13/3⅜
6/–*	3/–	Para Elec. Rlys. Ord.	5	4½	80/–	80/–
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	7/–	7/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/6	12/6
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	80½
7⅛d.*	8⅜d.*	Potteries Elec. Trac. Ord. ..	1	11/32	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	11/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	⅜	20/6	20/6
3/–	3/–	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	85½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	78½	77½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	75½
8/–	12/–	Shanghai Elec. Cons.	10	13	13½	13½
3d.	3d.	Singapore Elec. Trams. ..	5/–	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	92½	95½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/–	2/–	Un'd. El. Tr. Monte Video Ord.	5	4½	50/–	50/–
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	5/32	18/3	18/3
3/–	3/–	Do. 6% Cum. Pref. ..	5	5/32	82/6	86/3
4½%	4½%	Do. 4½% 1st Deb.	100	85½	80	80
—	—	Metropolitan Dist. Ord. ..	100	21⅜	16½	15½
—	—	Undgd. Elec. Rys. of London ..	10	21⅜	35/–	33/1½
		Do. "A"	1/–	5/32	6/–	5/9
4½%	4⅛%	Do. 4½% Bds. of 1933 Rd.	—	99	101½	101½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	100½	103
6%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	83¼	84

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Aug. 28	411	423	+ 12	21	9,428	+ 805
Aberdeen Corporation ..	,, 24	1,987	2,251	+ 264	12	26,983	+ 3 408
Ayr Corporation ..	Sept. 1	632	535	— 103	16	9,777	+ 900
Belfast City	Aug. 24	5,626	6,392	+ 766	21	129,932	+ 11,304
Birkenhead Corporation	Sept. 2	1,617	1,897	+ 280	22½	40,320	+ 5,754
Birmingham Corporation	Aug. 25	16,900	18,743	+ 1,843	21	375,500	+ 26,000
do. Motor Omnibuses ..	,, 25	1,068	1,177	+ 109	21	20,378	— 806
Blackburn Corporation ..	,, 29	1,305	1,392	+ 87	22⅔	34,255	+ 4,860
Blackpool & Fleetwood ..	Sept. 1	2,352	1,939	— 413	33	30,802	— 508
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,006
Bournemouth Corporation	Aug. 29	2,969	3,149	+ 180	21½	66,049	+ 2,674
Bradford Corporation ..	,, 25	8,017	8,084	+ 67	21	163,247	+ 15,002
Brighton Corporation ..	,, 19	1,942	2,216	+ 274	20½	30,826	+ 4,084
Bristol	,, 31	5,431	5,664	+ 233	34	186,559	+ 15,957
Burnley Corporation ..	Sept. 1	1,818	1,750	— 68	..	..	..
Burton-on-Trent Cor. ..	,, 2	302	341	+ 39	22	6,722	+ 578
Bury Corporation ..	,, 2	1,491	1,568	+ 77	22½	37,705	+ 4,445
Chatham & District ..	Aug. 23	1,498	1,507	+ 9	34	43,790	+ 2,690
Cork Electric	,, 23	580	595	+ 15	34	18,314	+ 1,136
Derby Corporation ..	Sept. 1	1,211	1,251	+ 40	22	26,634	+ 7 7
Dublin United	Aug. 31	6,831	6,790	— 41	35	231,744	+ 23,031
Dundee City	,, 29	1,458	1,625	+ 167	15½	23,681	+ 2,000
East Ham Corporation ..	Sept. 1	1,322	1,484	+ 162	22	31,797	+ 2,105
Exeter Corporation ..	Aug. 31	478	436	— 42	22	9,059	+ 5
Glasgow Corporation ..	Sept. 1	23,552	26,153	+ 2,601	13½	348,860	+ 40,638
Glossop (U.E. Sup. Co.) ..	,, 1	153	171	+ 18	35	5,180	+ 379
Halifax Corporation ..	Aug. 28	2,702	2,474	— 228	21½	55,399	+ 3,946
do. Motor Buses ..	,, 28	52	51	— 1	21½	1,024	— 74
Hastings and District ..	Sept. 2	1,646	1,791	+ 145	35	42,765	+ 6,388
Huddersfield Corporation	,, 1	3,015	3,131	+ 116	22	72,947	+ 6,124
Hull Corporation ..	,, 1	3,168	3,543	+ 375	22	74,705	+ 4,676
Ilford U.D. Council ..	,, 1	680	817	+ 137	22	17,355	+ 1,705
Ipswich Corporation ..	,, 1	595	817	+ 222	22	15,505	+ 3,003
Isle of Thanet	,, 1	797	469	— 328	48	14,947	— 2,506
Kilmarnock Corporation ..	,, 1	184	201	+ 17	15½	3,039	+ 215
Lanarkshire	Aug. 23	2,631	2,963	+ 332	34	91,750	+ 14,151
Lancashire United ..	,, 29	2,014	2,579	+ 565	35	79,839	+ 17,309
Leeds City	Sept. 1	10,534	10,767	+ 233	22	244,153	+ 23,702
Leith Corporation ..	,, 1	932	1,055	+ 123	15½	17,111	+ 2,919
Leyton U.D. Council ..	Aug. 23	1,904	2,026	+ 122	21	40,629	+ 4,339
Liverpool Corporation ..	Sept. 1	14,964	15,884	+ 920	34½	535,205	+ 45,147
Llandudno & Colwyn Bay	Aug. 24	884	836	— 48	38½	12,521	— 789
London County Council	Sept. 5	49,247	59,227	+ 9,980	22½	1,263,094	+ 161,752
Maidstone Corporation ..	Aug. 29	240	253	+ 13	22	5,435	+ 501
Manchester Corporation	Sept. 1	19,468	20,409	+ 941	22	451,744	+ 30,513
Nelson Corporation ..	Sept. 1	242	233	— 9	22	5,187	+ 306
Newcastle-on-Tyne Cor.	,, 1	6,517	7,810	+ 1,293	22	170,647	+ 24,223
New St. Helens & Dist. ..	Aug. 29	1,132	1,459	+ 327	9	14,964	+ 4,243
Northampton Cor. ..	,, 31	759	834	+ 75	22	18,130	+ 2,264
Nottingham Corporation	,, 30	4,191	4,548	+ 357	22	95,378	+ 8,922
Oldham Corporation ..	Sept. 2	2,636	2,969	+ 333	23	66,159	+ 6,755
Portsmouth Corporation	,, 1	3,291	3,137	— 154	..	..	..
Preston Corporation ..	Aug. 29	1,187	1,189	+ 2	21½	25,786	+ 1,677
Provincial	Sept. 1	2,885	2,681	— 204	48	110,439	+ 888
Reading Corporation ..	Aug. 30	957	1,114	+ 157	21½	22,638	+ 3,834
Rhondda Tramways ..	,, 30	1,399	1,541	+ 142	35	51,365	+ 7 310
Rochdale Corporation ..	Sept. 4	1,927	2,373	+ 446	18	38,283	+ 4,658
Rotherham Corporation	,, 5	1,678	1,837	+ 159	22½	40,276	+ 5,635
Salford Corporation ..	,, 3	5,489	6,663	+ 1,174	22⅔	148,509	+ 23,170
Sheffield Corporation ..	,, 2	10,703	12,141	+ 1,438	23	272,945	+ 30,204
Southampton Cor. ..	Aug. 29	1,828	2,114	+ 286	21½	43,155	+ 6,447
Southend-on-Sea Cor. ..	Sept. 1	1,430	1,153	— 277	18	16,939	+ 1,157
South Shields Cor. ..	,, 1	971	985	+ 14	22	21,234	+ 2,437
Sunderland Corporation.	,, 2	1,732	1,827	+ 95	22	40,348	+ 3,240
Sunderland District ..	Aug. 29	685	758	+ 73	44	31,131	+ 4,453
Swindon Corporation ..	,, 29	236	273	+ 37	21½	5 924	+ 1,453
Torquay Tramways ..	,, 30	955	915	— 40	35	21 839	+ 1,419
Tyneside Trys. & Trmrds	,, 22	688	1,011	+ 323	8	7,719	+ 1 855
Wallasey Corporation ..	Sept. 1	1,627	1,609	— 18	22½	36 667	+ 4,043
Walsall Corporation ..	,, 1	876	971	+ 95	22	21,321	+ 2,397
Walthamstow U.D. Coun.	,, 1	1,102	1,264	+ 162	22	28,545	+ 3,124
Warrington Corporation	Aug. 30	520	566	+ 46	22	11,576	+ 816
West Ham Corporation	,, 30	3,152	3,778	+ 626	21½	51,362	+ 9,087
Wigan Corporation ..	,, 30	1,693	1,992	+ 299	21	42,758	+ 5,642
Yorkshire (West Riding)	Sept. 2	1,898	2,424	+ 526	35	73,398	+ 12,208

The following Corporations and Companies have suspended the issue of Traffic Returns during the War :—

Accrington Corporation, Blackpool Corporation, British Electrical Federation, Cardiff Corporation, Chesterfield Corporation, Colne Corporation, Croydon Corporation, Dover Corporation, Glasgow Subway Co., Leicester Corporation, London General Omnibus Co., London United Tramways Co., Lowestoft Corporation, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.) Corporation, South Metropolitan Electric Tramways and Lighting Co.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Wks.	Aggregate. 1917	Increase or Dec.
Anglo-Argentine	Sept. 2	£47,933	£50,116	35	£1,788,768	+ £16,779
Auckland .. (28 days)	July 27	21,507	21,799	4	21,799	+ 292
Ballarat and Bendigo ..	June 17	2,794	2,849	12	1,0451	+ 76
Brazilian Traction (Mlrs.)	June	7,178,000	7,642,000	26	44,646,000	+ 3,467,000
Brisbane	July	32,880	32,720	30	226,315	— 915
British Columbia .. $	July	411,847	438,378	4	438,378	+ 26,531
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	July	26,340	26,288	52	39,167	+ 29,082
Calcutta .. .. Rs.	Sept. 1	65,007	69,550	35	2,375,515	+ 23,990
Cape Town	July	..	16,067	..	..	..
Carthagena and Herrerias	Aug.	2,081	4,164	34	34,099	+ 13,278
Cordoba	July	14,258	14,343	18	56,154	— 1,165
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Aug.	2,522	1,562	4	1,562	— 960
Hong Kong .. .. $	July 21	16,147	13,355	29	388,489	— 14,467
Kalgoorlie	May	2,921	2,692	21	12,793	+ 356
La Plata	Aug.	3,793	4,076	34	33,095	— 532
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	May	..	233,765	..	..	..
Madras .. (2 weeks) Rs.	Aug. 31	34,066	38,031	34	553,976	+ 50,520
Manila .. .. $	May	53,900	61,500	..	..	..
Manaos .. .. Rs.	May	..	158,613	..	..	..
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	Sept. 2	3,148	4,013	34	130,575	+ 25,864
Peruvian .. .. $	Aug.	895,900	979,430	8	1,954,430	+ 223,100
Port Elizabeth	July	..	3,544	..	..	..
Rangoon	Aug.	4,253	4,788	34	39,191	+ 2,000
Shanghai .. .. $	June 27	19,736	26,951	..	..	..
Singapore .. .. $	July 7	12,726	12,917	27	351,015	+ 16,142
Toronto .. .. $	July	867,789	954,192	30	6,827,776	+ 624,788
Winnipeg .. .. $	July	242,688	242,797	30	1,916,167	— 27,995

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, SEPTEMBER 13, 1917. VOL. XLII.

THE TRAMWAYS OF SHANGHAI.

A BRITISH UNDERTAKING PROSPERING IN FACE OF DIFFICULTIES.

The electric tramway undertaking in Shanghai, owned by the Shanghai Electric Construction Company, Limited, is a remarkable example of what can be done by skill and energy even in spite of adverse conditions. In the eight years that have elapsed since the tramways were opened, Mr. D. McColl, the general manager, and his assistants have brought into existence a sound and profitable business—a feat the difficulty of which may be gauged from a glance at some of the comparative figures and a consideration of the local conditions as set out in this article. The solution of the problem, indeed, severely tested the management's resources in experience and ingenuity, and happily the results have quite exceeded expectations. The adaptability of the British race to all sorts of conditions is indeed well illustrated by such a case, where a few men are sent out to a place like Shanghai, and are able, by a study of the Oriental, added to administrative, financial, and engineering ability, to make a tramway a success in conditions of extraordinary difficulty. The present position may be indicated by a few figures from the last report of the company, that for the year ended December 31 last. The revenue was £115,006, after allowing no less than £38,751 for loss by exchange of subsidiary coinage into local dollars. After paying all expenses there was a profit of £48,123. A sum of £10,000 was transferred to renewals fund, £5,000 was written off preliminary expenses, and a dividend of 10 per cent. was paid to the shareholders.

Shanghai is situated on the Whangpoo, 12 miles up the river and 32 miles from the outer bar of the southern entrance to the Yangtsze-kiang. It is the commercial metropolis of North China, more than half of the whole trade of China being controlled there.

Typical Passenger Vehicles Seen in Shanghai.

By far the most important portion of Shanghai is that called the Foreign (or International) Settlement, the population of which at the last census in 1915 was 639,000. The area of the Foreign Settlement is 8⅔ square miles. It is administered by a Municipal Council, the membership of which is always overwhelmingly British, and does not now include a single German or Austrian. In the adjoining French Concession and areas administered by the Chinese authorities there is also a large population, and it is

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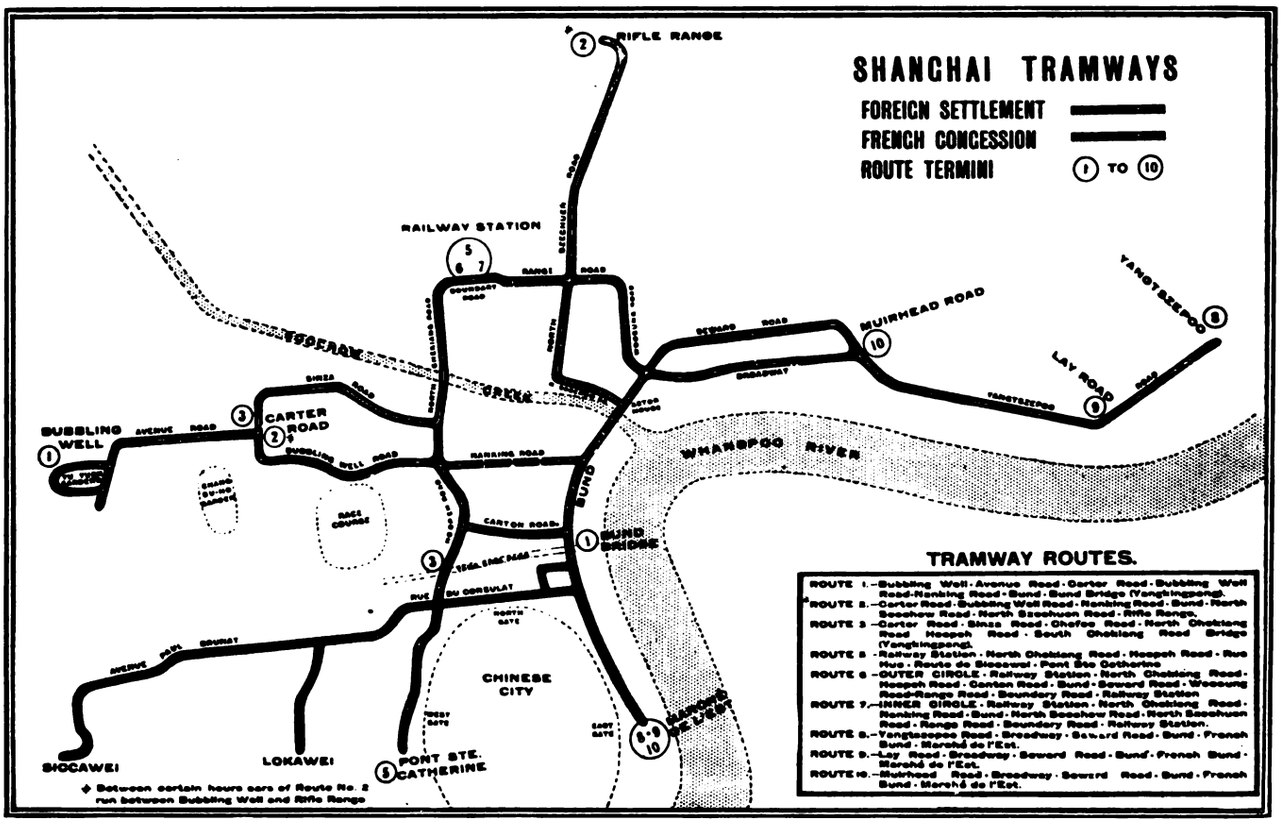
reckoned that the total population of Shanghai is well over 1,000,000.

The tramway concession, which was granted by the Municipal Council in 1905, provides that the concession shall be in force in perpetuity, subject to the proviso that at the end of 35 years, or of any subsequent period of seven years, the Council may purchase the undertaking as a going concern. By the concession the company is required to pay to the Council a royalty of 5 per cent. on the traffic receipts, to maintain the road surfaces on its tracks and to a distance of 18 inches beyond the outer rails, and to purchase from the Municipal Council the energy required for working the system. It also confers on the company the prior option for extensions, and requires that the undertaking shall not be owned or operated by other than a British company.

The Shanghai Electric Construction Company, Limited, was registered in London in 1905, with Sir Alfred Dent, K.C.M.G., as chairman, to carry the scheme into effect. The initial capital was £320,000, in ordinary shares. The work of construction was carried out by Messrs. Bruce Peebles and Co. Ltd., Edinburgh, and the lines were opened for traffic on March 5, 1908. In June of the same year Mr. Donald McColl came from the official staff of the London Underground Railways to take up the position of general manager. Mr. McColl had previously had varied tramway experience under the Glasgow Corporation and with the Lisbon Electric Tramway Company, Limited, following a commercial training with a large engineering firm in Glasgow.


SHANCHAI TRAMWAYS
FOREIGN SETTLEMENT
FRENCH CONCESSION
ROUTE TERMINI ① TO ⑩
RIFLE RANGE
RAILWAY STATION
MUIRHEAD ROAD
YANGTSZEPOO
LAY ROAD
BUBBLING WELL
CARTER ROAD
WHANGPOO RIVER
BUND
BUND BRIDGE
CHINESE CITY
SIKAWEI
LOKAWEI
PONT STE. CATHERINE
TRAMWAY ROUTES.
ROUTE 1.—Bubbling Well · Avenue Road · Carter Road · Bubbling Well Road · Nanking Road · Bund · Bund Bridge (Yangtzepoo).
ROUTE 2.—Carter Road · Bubbling Well Road · Nanking Road · Bund · North Szechuen Road · North Szechuen Road · Rifle Range.
ROUTE 3.—Carter Road · Sinza Road · Chefoo Road · North Chekiang Road · Haopoh Road · South Chekiang Road · Bridge (Yangtzepoo).
ROUTE 5.—Railway Station · North Chekiang Road · Haopoh Road · Rue Hua · Route de Siccawei · Pont Ste Catherine.
ROUTE 6.—OUTER CIRCLE · Railway Station · North Chekiang Road · Haopoh Road · Canton Road · Bund · Seward Road · Woosung Road · Range Road · Boundary Road · Railway Station.
ROUTE 7.—INNER CIRCLE · Railway Station · North Chekiang Road · Nanking Road · Bund · North Szechuen Road · North Szechuen Road · Range Road · Boundary Road · Railway Station.
ROUTE 8.—Yangtzepoo Road · Broadway · Seward Road · Bund · French Bund · Marché de l'Est.
ROUTE 9.—Lay Road · Broadway · Seward Road · Bund · French Bund · Marché de l'Est.
ROUTE 10.—Muirhead Road · Broadway · Seward Road · Bund · French Bund · Marché de l'Est.
✦ Between certain hours cars of Route No. 2 run between Bubbling Well and Rifle Range.

Track Construction.

The track owned by the company consists of 25·81 miles of track, of which 9·38 miles is double and 7·04 miles single line. No extensions of the tramway track have been made since the opening. The company's lines are shown diagrammatically on the accompanying map, and also those in the adjoining French Settlement. The track is of metre gauge, laid on a concrete foundation 6 in. deep, the road surfaces being generally of water-bound macadam with stone setts lining the rails on both sides. On about two miles of the main thoroughfares used by foreigners there is wood paving, the first used for road work in China. The rails are of British standard section, weighing 90 lbs. per yard. The soil is alluvial, and the tide rises on most parts of the route to within three feet of the road surface; the track on this account requires much attention.

After experimenting with different methods of welding the joints electrically, the management has devised a method whereby the old fishplates are welded to the rails, the electrodes used being also those of the company's design, and arranged so that the deposit of metal contains the same percentage of carbon as the rail itself. This system, whilst absolutely efficient, is materially cheaper than any other known to the management. Of about 2,500 joints so welded no failures have taken place. One joint in every eight is left unwelded as an expansion joint, and joints at curves, points, and crossings are also left unwelded. The welding of the track will be completed during the current year. An illustration of the welding machine is given on a following page.

Overhead Equipment and Feeder Cables.

Steel tubular poles are used throughout with bracket-arm suspension for single track and span-wire suspension for double track.

The original bitumen-covered underground cables developed numerous defects as a result of more or less general decentralisation of the copper, and have been replaced by overhead cables. These are of bare stranded copper, run on the company's poles. Current is at present supplied from the Council's direct-current plant. Later, upon this plant being discarded, traction current will be supplied through sub-stations from alternating plant, when the company will provide underground feeders from the sub-stations to the lines.

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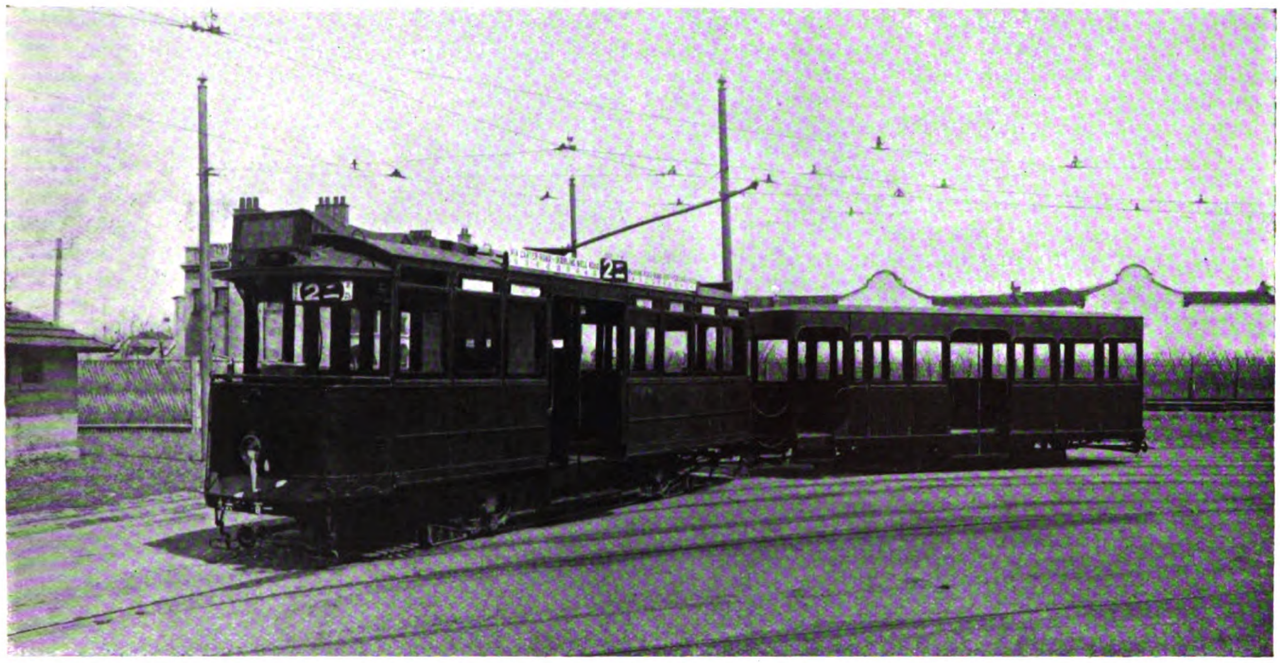
Rolling Stock.

Motor Cars.—The service was opened with 65 single-deck cars of the single-truck, end-entrance type. These were built by the Brush Company, and equipped with Bruce Peebles and Company's motors and controllers. These cars have two compartments, with seating accommodation for 12 first-class and 20 third-class passengers. The weight unloaded is about 9 tons. When additional motor cars came to be required, a centre-entrance type of car, designed by the management to suit local requirements, was introduced. These cars are equipped with Brill radiax trucks and Westinghouse motors and controllers. The weight unloaded is about $9\frac{1}{2}$ tons. The 12 ft. wheel-base ensures freedom from oscillation, a disadvantage of the original type of single-truck car with rigid axles and 6 ft. 6 in. wheel-base. The seating accommodation of the new type is the same as that of the original type. There are now 25 cars of the new type whose bodies have all been built locally, making a total of 90 motor cars.

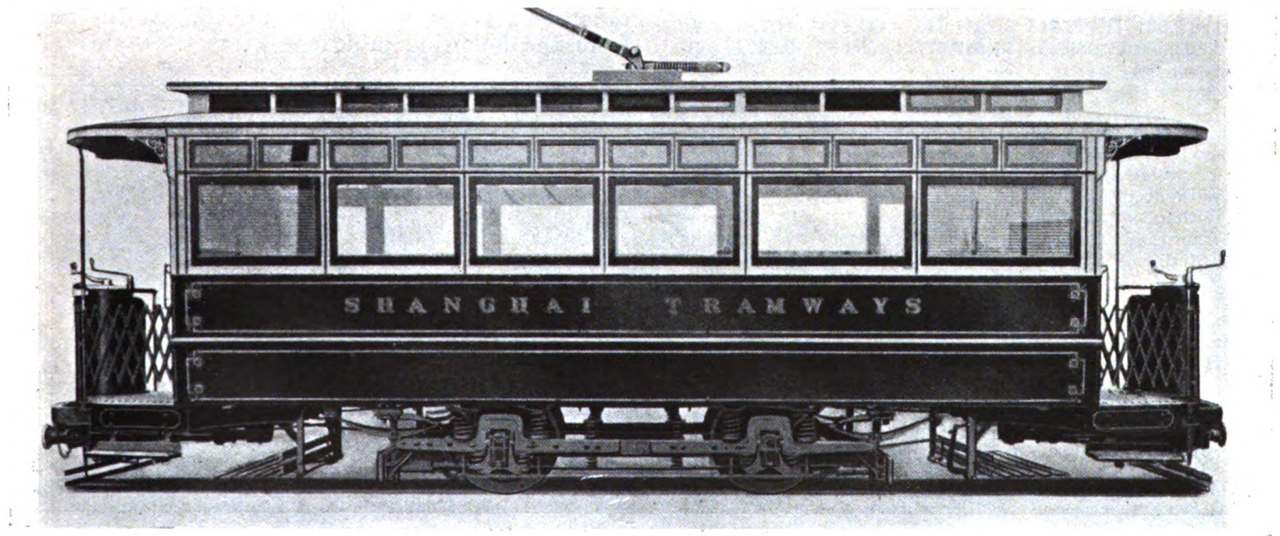
Trailer Cars.—Both one-compartment and two-compartment trailer cars are employed to suit traffic conditions on different routes. A two-compartment trailer attached to a motor car is shown in the accompanying illustration. As the lines are practically level, braking of the trailers is unnecessary for service stops, and no brakesmen are employed. The trailers are equipped with solenoids by means of which, on emergency application of the power brake by the motorman, brake blocks are applied to the four wheels of the trailer. There are 70 trailer cars, each weighing about $4\frac{3}{4}$ tons.



Centre-Entrance Motor Car with Trailer—Shanghai Tramways.

Development of the System.

When the tramways were opened, there were thousands of rickshas plying at very low fares. Each ricksha is pulled by one man and usually carries one passenger, and has the advantage from the passenger's point of view of taking him up and putting him down exactly where he wishes, whilst the tramcars are confined to taking up and putting down passengers at the authorised stopping-places on the main roads where there are



Type of First Cars Used in Shanghai.

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tramway lines. The problem was a difficult one, not only on this account, but also because of the extraordinarily low wages of the native population—the foreign population and the better-off Chinese formed an insignificant proportion of the total population—and it was necessary, if the tramways were to be a commercial success, that they should become popular with the masses of the native population. Another difficulty arose in connection with the Chinese copper coins in which the bulk of the fares had to be collected. These were undepreciated when the tramway concession was entered into, but by the time the system was opened they had fallen in value by about 10 per cent. (This was due to excessive issues of coins by the Chinese Government and to the coins not being redeemable at face value.) For the first year the gross receipts collected on the cars were reduced by about 15 per cent. owing to this depreciation; the second year showed a depreciation of 24 per cent., and it remained between 22 per cent. and 24 per cent. until 1913. In 1914 it jumped to 26 per cent., and in 1915 to 28½ per cent., and in 1916 it went down to 26¾ per cent. To enable home readers to appreciate this clearly, it may be said that every penny collected on the cars would be worth less than three farthings when lodged in the bank.

Applying this depreciation to the figures of all the tramway undertakings in the United Kingdom, the result would be that, with the same fares as at present, they would in the aggregate be insolvent. The Shanghai management could not attempt to offset the depreciation by an increase of fares, because the fares were found at the beginning to be really not low enough to attract an adequate volume of traffic, in view of the extremely low-paying capacity of the bulk of the native population and of the keen competition of rickshas at almost incredibly low fares. The manner in which Mr. McColl solved the problem would take too long to explain; experiments with sections, fares, and services, all in a given direction and in pursuance of a policy to develop a very large volume of traffic, extended over four years. The remarkable results speak for themselves.

Year.	Car Miles.	Passengers.	Gross Receipts.	Effective Receipts. Mex. $	Working Profit. Mex. $	Dividend. Per cent.
1909	1,979,001	11,772,715	$ 557,630	441,541	47,736	*Nil*
1916	3,803,980	69,089,432	$1,537,577	1,150,067	502,927	10

As volume is so important a feature of the Shanghai traffic, the following comparison is of interest:—

PASSENGER JOURNEYS PER ANNUM PER MILE OF ROUTE.

Glasgow (1915-16)	3,648,525
Manchester (1915-16)	1,748,252
Birmingham (1914-15)	2,224,519
Liverpool (1915)	2,250,085
Average	2,467,679
Shanghai (1916)	4,009,834

The following figures are also of special interest:—

	1909.	1916.
Passengers per car-mile	5·95	18·16
Effective receipts per passenger	3·77 cents.	*1·66 cents.
Effective receipts per car-mile	22·31 cents.	30·23 cents.

* Equal to 0·43d.

The high occupancy of the cars is largely explained by the steady, all-day traffic which has been cultivated. The ratio of passenger miles to seat miles for 1916 was over 64 per cent. This in turn has ensured an excellent service factor which was as high as 49 per cent. for 1915; that is to say, the actual car service run (reckoned in car hours) was equal to 49 per cent. of the service which would have been run if the average maximum number of cars in service weekly had been running for 24 hours per day for the 366 days of that year. In computing mileage and the number of cars in service, trailers are treated throughout as separate cars; therefore one mile run by a two-car train is reckoned as two car-miles. Mr. McColl prefers this method to the continental system of reckoning every trailer mile as only half a car-mile.

MONTHLY TICKETS.

For the convenience mainly of foreigners, first-class monthly tickets are issued available for any number of journeys over all the lines at the following rates:—

Adults, 6 dollars per calendar month=about 12s. 9d.

Children under 16 years of age, 3 dollars per calendar month=about 6s. 4d.

About 1,100 adult tickets and 300 children's tickets are usually issued. The colour of the tickets is changed monthly.

ACCIDENTS.

Notwithstanding the very heavy traffic, the record of accidents has steadily improved, as will be seen from the following table:—

	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.
Total passengers (thousands)	69,089	59,750	55,647	47,686	40,734	27,257	18,751	11,772
Number of accidents with other vehicles:—								
(a) Without personal injury	313	256	409	385	301	234	283	320
(b) With personal injury	25	29	43	52	69	55	64	44
Personal injuries (unconnected with other vehicles):—								
(a) Entering or leaving cars*	172	198	209	225	252	240	177	85
(b) Pedestrians in front of cars	63	65	86	94	103	93	108	97
Fatalities:—								
(a) Knocked down	10	8	3	9	9	4	4	4
(b) Leaving cars in motion	2	6	8	5	9	6	—	—
(c) Boarding cars in motion	1	1	—	—	—	—	—	—
(d) Passenger leaning out and struck by passing car	—	1	—	—	—	—	—	—
Total accidents	587	564	758	770	743	632	636	550
Accidents per million passengers	8·49	9·44	13·62	16·10	18·24	23·18	33·92	46·72
Total personal injuries	274	308	349	385	442	398	353	230
Personal injuries per million passengers	3·97	5·16	6·27	8·03	10·85	14·60	18·82	19·54

* Practically all accidents occurred owing to passengers entering or leaving when cars were in motion.

No extensions of track had taken place. The development of traffic continues, and the effective receipts in 1917 are showing an increase of about 15 per cent. over the corresponding period of 1916.

In only two of the verdicts at the inquests on the above fatalities was any blame placed on the motormen. Practically all fatalities resulting from being knocked down by cars have been to aged and often deaf natives

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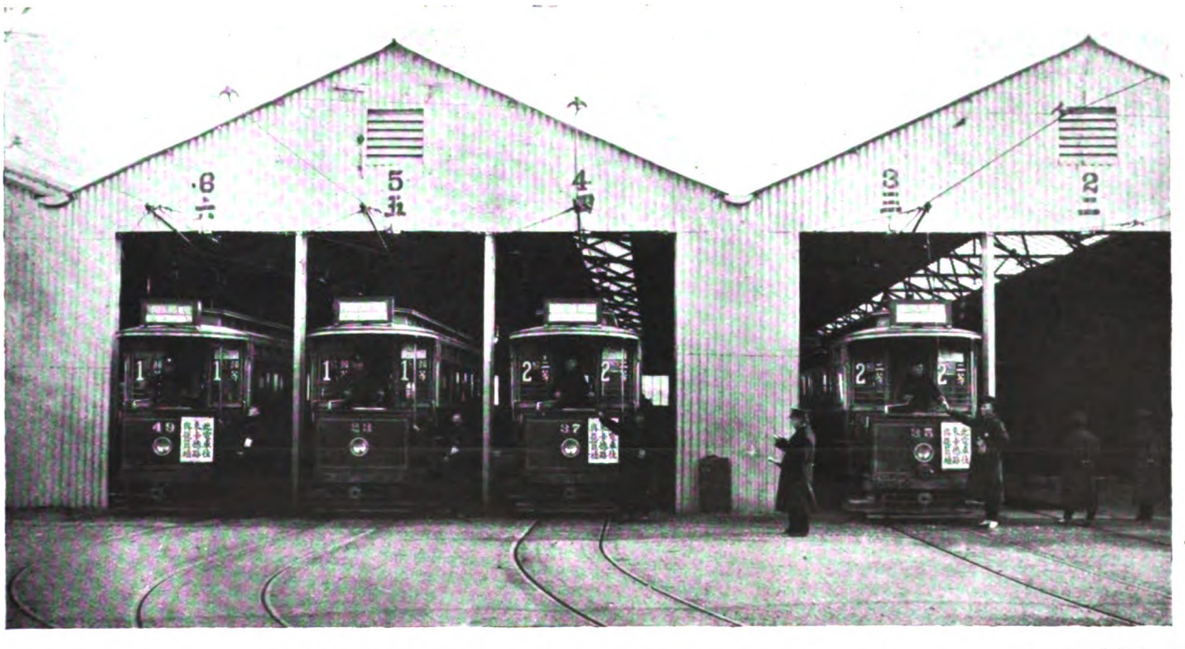
A Complicated Junction.

Motor and Trailer Cars in a Main Street.

A Busy Junction.

Rickshas and Tramcars in Hanking Road.

Typical Views in Shanghai.



Two Bays at Bubbling Well Car Sheds—Shanghai Tramways.

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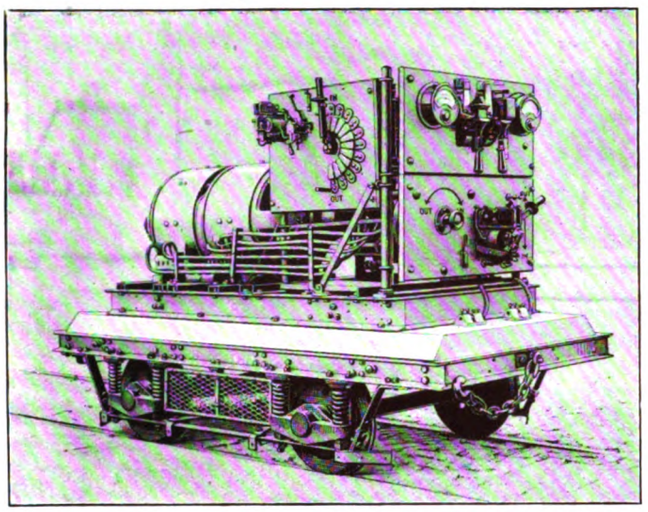
or to native children, and nearly all fatalities due to leaving cars in motion have been to natives from the country, who were wholly unacquainted with street traffic.

Collection of Revenue.

In a country the natives of which seldom consider it anything but foolishness not to take advantage of



Welding Machine Used by Shanghai Tramways.

any opportunities for illicit gains, and where native passengers are more likely to co-operate with conductors to defraud the company than the reverse, the system of checking the collection of the revenue has to be as tight and complete as it can possibly be made. It would occupy too much space to detail the complete ticket check system of the Shanghai undertaking, but we are able to give the following summary of some of its more important features :—

(1) All tickets are printed by the company from specially made paper, the stock of which is closely controlled and the output in tickets checked with the issues of paper to the printing department.

(2) The total and journey way bills, although separate, are produced by the one writing, and therefore correspond. The former remains in the cash office whilst the conductor is on duty.

(3) A conductor cannot anticipate the series and numbers of the tickets to be supplied him.

(4) It is ensured that the way bills for all the duties worked by conductors have been received and settled for.

(5) It is checked that there are no unexplained gaps between the last numbers of the tickets on the way bills of one day and the first numbers on the way bills of the corresponding boxes (issued to different conductors) on the next day of issue, so that tickets cannot be issued with unofficial waybills and unaccounted for.

(6) Intelligent and well-trained ticket inspectors of other races than that of the conductors.

(7) Daily detailed verification of banked receipts.

(8) Daily scrutiny in the head office of a number of tickets collected from passengers, with a view to detection of any spurious tickets.

(9) Monthly comparison of ascertained ticket stocks with balances of ticket stock accounts to which all tickets printed are debited, and all tickets sold, as per official traffic returns, are credited.

That 18·16 fares per car-mile were turned in during 1916 is evidence of the efficiency of the system.

Working Expenses.

The liberal use of trailer cars is one of the factors tending to keep down working expenses per car-mile, which for the year 1916 were as under :—

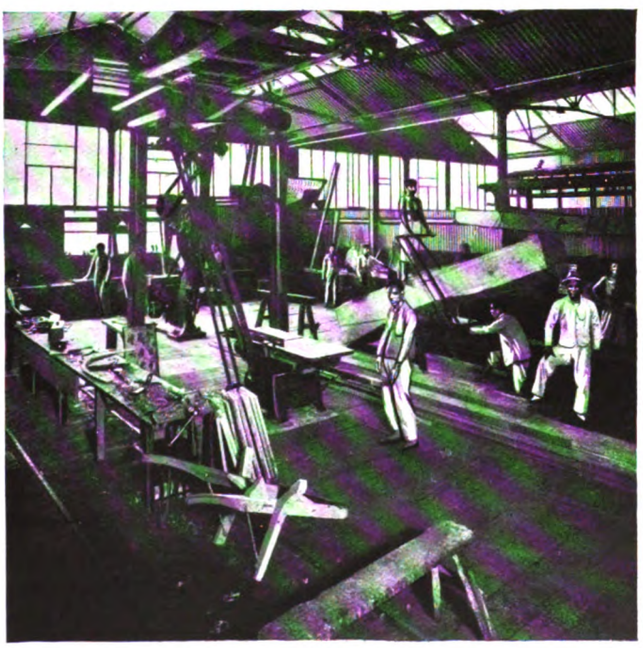
	Per Car-mile.
Traffic	1·10d.
General	0·83d.
Repairs and maintenance	1·41d.
Power (purchased)	0·69d.
	4·03d.

The ratio of trailer car-miles to motor car-miles for 1916 was 60·02 per cent., and is being gradually increased. Traction units per ton-mile for 1916 were 0·1129.

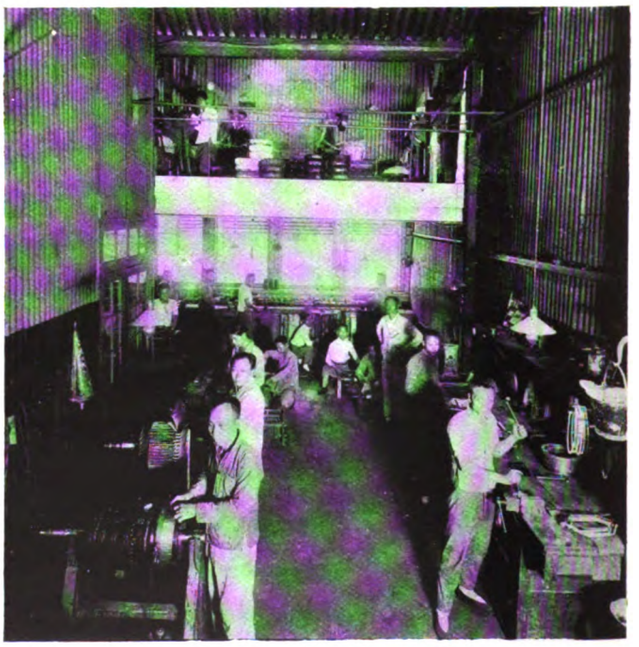
Car Works.

Views of the works are given in Figs. 12-15. Each car receives a mileage overhaul after it has run 3,000 miles, which it does about every six weeks. As part of this overhaul tests on armatures, field coils, rheostats, and through all equipment from trolley wheel to earth cable are carried out as follow :—

Armatures	Bar to bar and insulation tests.
Field coils	Resistance and insulation tests.
Rheostats	Resistance and insulation tests.
Equipment	Insulation test.



Carpenters' Shop.



Armature Shop.

Continuous records are kept of these tests. Mileage records of all important parts of equipments are also kept

All armature coils are made up in the company's works, as also are the field coils, the latter being stripped of old insulation, re-insulated, and re-wound when necessary.

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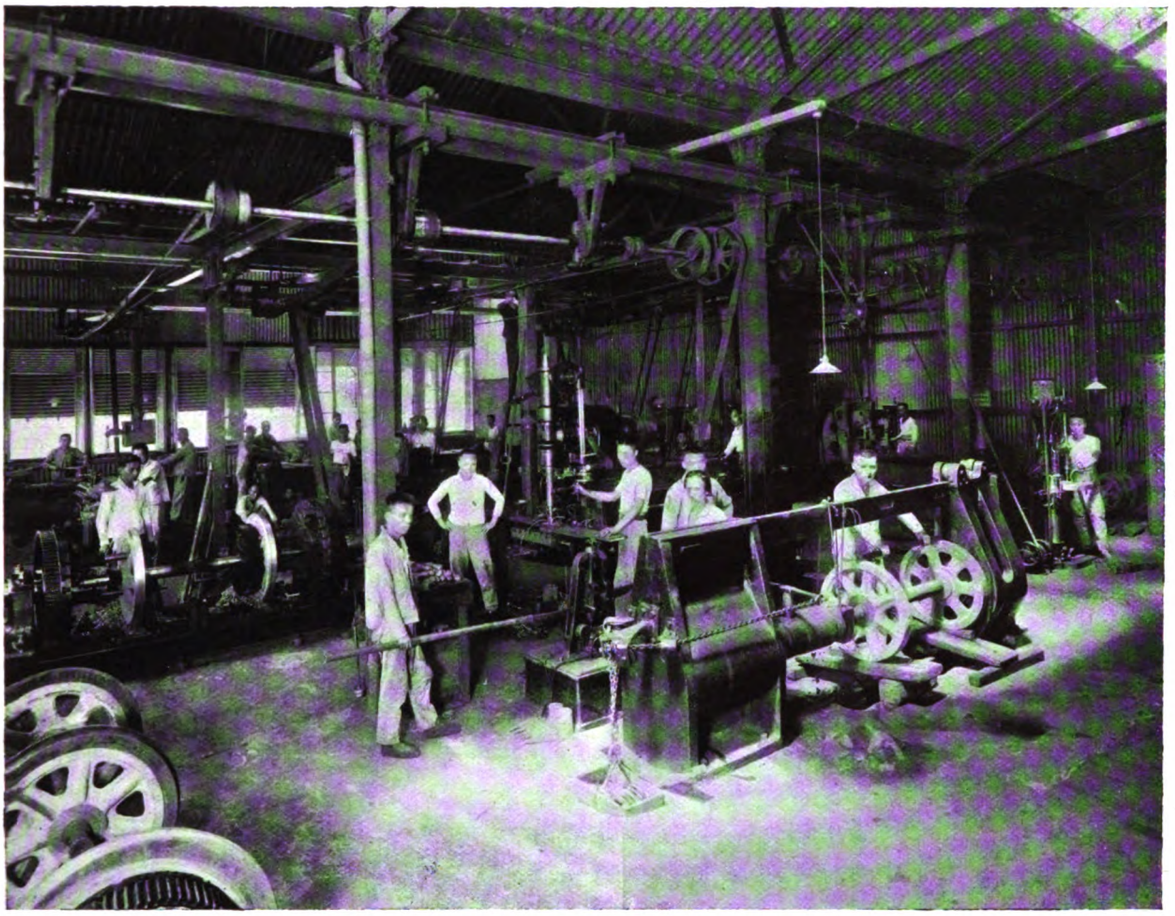
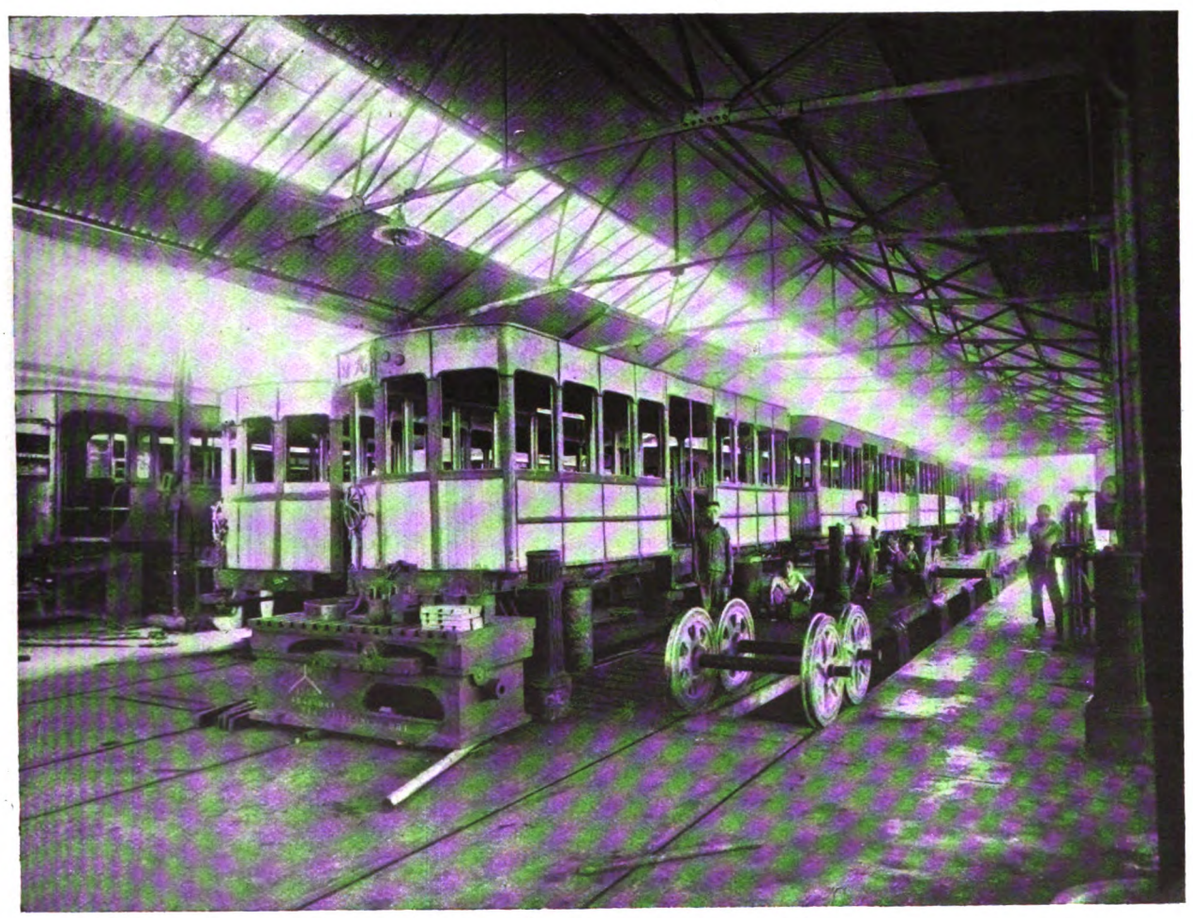


Machine Shop—Shanghai Tramways.



Interior of Bubbling Well Car Shed—Shanghai Tramways.

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The company has its own brass foundry, and casts its own trolley wheels, journal brasses, check brasses, etc., as well as all parts for overhead equipment of line.

During the day extensive use is made of the electric welding plants employed at night for welding rail joints, and countless parts are thereby saved from the scrap heap. Oxy-acetylene welding is also employed but only for work for which electric welding is not suitable.

Donald McColl,
General Manager, Shanghai Electric Tramways.

Ticket Printing.

The company prints all its own tickets, and also those for the neighbouring tramway system in the French Settlement. The ticket printing machine is of the rotary type, using rolls of fairly thin paper 3⅞ in. wide. It prints 360 tickets per minute, and runs day and night. Since the commencement of the war it has been necessary to have the paper made locally, but the paper mill could not undertake to supply it in rolls of less than 92 in. wide. The Tramway Company had therefore to make its own arrangements for cutting the 92 in. rolls into 3⅞ in. rolls suitable for the printing machine, and it designed, and made in its own shops, the motor-driven cutting machine.

Railless Electric Traction.

A narrow, busy thoroughfare, regarded as unsuitable for tramways, was equipped for railless electric traction, the road being relaid by the Council in cement concrete, towards the cost of which the company contributed one-half. The service was opened on July 6, 1915, with the cars reduced from their original weight of 4¾ tons to 3¾ tons by the removal of one of the two 20-H.P. motors, the adoption of a branch trolley head with only one trolley base and pole instead of two, and a number of minor changes. This head was designed by the company in Shanghai, and gives excellent service. The cars (Fig. 16), of which there are seven, were built by the R.E.T. Construction Company, Limited, the general arrangement of body, lifeguards, etc., being to the drawings of the Shanghai Tramways. The cars have operated with remarkable success and safety in the congested thoroughfare on which they run. The electrical equipments are by Dick, Kerr and Company, Limited, and give complete satisfaction. A short extension was opened on September 21, 1916, making the total length of the route slightly over one mile. Since the opening of the extension the route has carried the extraordinary heavy traffic of practically five million passengers per mile of route per annum, a wonderful tribute to the efficiency of such cars. The company hopes to be able in the future to develop this form of traction, and also to conduct a considerable freight business by means of railless vehicles, a special type of which is being designed to suit the local conditions.

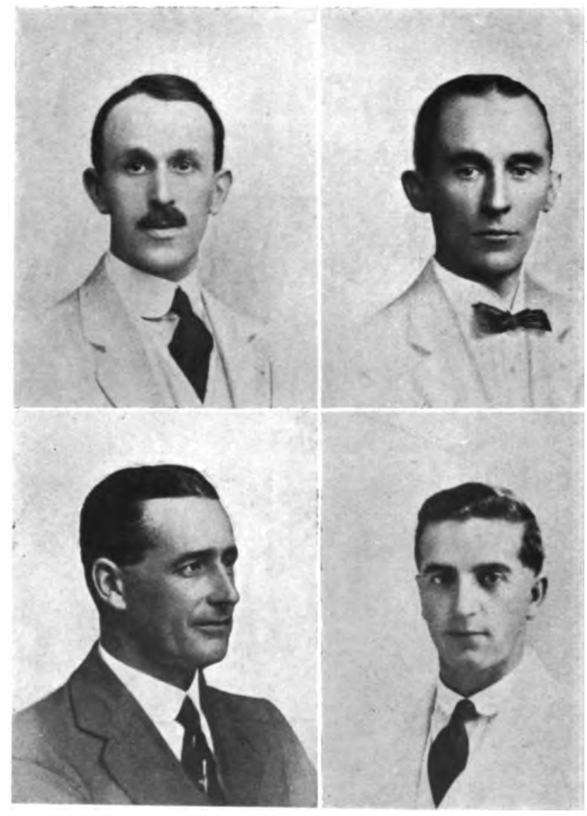
Directors.

The London board consists of Sir Alfred Dent, K.C.M.G. (chairman), Emile Francqui, R. S. Portham, M.I.C.E., J. S. Haskell, and Chevalier Edmond Carton de Wiart.

The local board consists of:—Edward Wheeley (chairman), L. J. Cubitt, G. M. Wheelock. and R. McE. Dalgleish. The secretary of the company is Mr. L. W. Hawkins, Basildon House, Moorgate Street, E.C.

Staff and Employees.

The company's foreign staff of trained tramwaymen from home numbers 14, of whom there are three on active service, whilst the others of military age have volunteered but cannot be spared. The office staff is largely Portuguese. There are about 1,100 Chinese employees; the majority of the traffic inspectors are Koreans, whilst Japanese and Indians are also represented to a small extent.



J. S. Smeeton,
Deputy General Manager.

E. Carroll,
Traffic Manager.

H. J. Blatchford,
Line Engineer.

J. L. Gordon,
Rolling Stock Superintendent.

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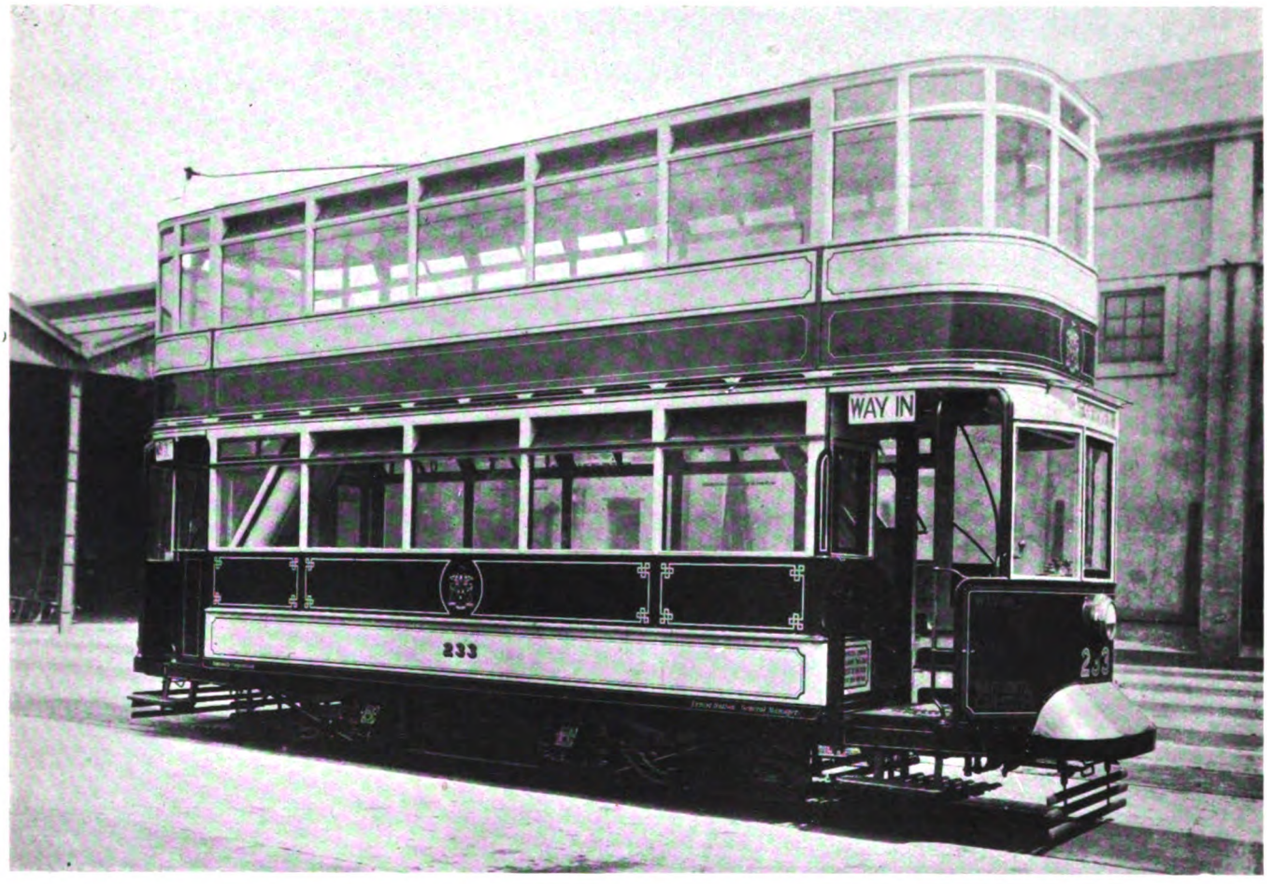
AN IMPROVED CAR AT NEWCASTLE.

Amid the stress of vastly increased traffic resulting from the conditions incident to the war, the general manager of the Newcastle Corporation Tramways has found time to produce two new car designs which are of exceptional interest. As our readers may remember, Mr. Hatton found it exceedingly difficult to provide cars to carry munition workers, and at an early stage in the war he devoted much attention to the problem of reconstructing certain single-deck cars in order to carry more passengers and to make quicker journeys. The former object was secured by reducing the number of seats; the latter by the adoption of the front exit so often advocated in these columns.

The reconstructed cars were described and illustrated in our issue of April 13, 1916. At the outset, as was only to be expected, the introduction of the front exit did not escape some local criticism, but the continuation of the experiment has more than justified Mr. Hatton's innovation. As expressed in the entire absence of third party accident claims, the result has been so satisfactory that it should awaken the keen interest of managers who have annually to meet a large outlay on that account. The records of the Newcastle Tramways show that over a period of eighteen months, with seventeen front exit cars in service, not one accident to passengers boarding or leaving them has occurred. We may add that as the cost of compensation for third party claims on the Newcastle Tramways—largely the result of accidents in boarding or leaving cars—amounts to about £3,000 per annum, complete proof is afforded of the accuracy of our frequently expressed view that front exit operation will effect considerable saving in this direction.

As will be seen in the photograph of the exterior of the new front exit car, which followed the reconstructed type, the car, although mounted upon a single truck, has characteristics which resemble the bogie type. This is due partly to the adoption of the front exit and partly to the use of an entirely new form of staircase, the joint result securing a longer body and enabling the platforms to be made shorter.

Hitherto attempts at producing a double-deck tramcar with front exits have all been in the direction of lengthening the car platform, which is detrimental to the construction and life of the car body itself, owing to the extreme length of the cantilever arms supporting the platform; whereas in the car shown in our illustrations the construction is such that an entirely opposite effect is produced. An additional advantage is that the staircase being entirely enclosed, it is kept dry under all conditions of weather. The complete enclosure of the staircase also makes it impossible for a passenger to be thrown over the staircase rail into the roadway. The platforms have a closed front above the dashboard, so that the motorman is protected from wind and rain, and will thus meet the views of the employees, who in many places are pressing for protection. A method of temporarily closing the opposite side of the front exit platform is for convenience in illustration shown in the photograph on the same side as the entrance platform. The closure is effected by means of a portable door. The entrance is 2 ft. in width, and the platform 4 ft. 6 in., the body being 20 ft., giving a total length of 29 ft. This form of construction easily lends itself to a wheel base of 8 feet if desired, without requiring any alteration in the proportions of the platform arms. The seating capacity of the lower deck would be



Exterior of Improved Front Exit Car—Newcastle Corporation Tramways.

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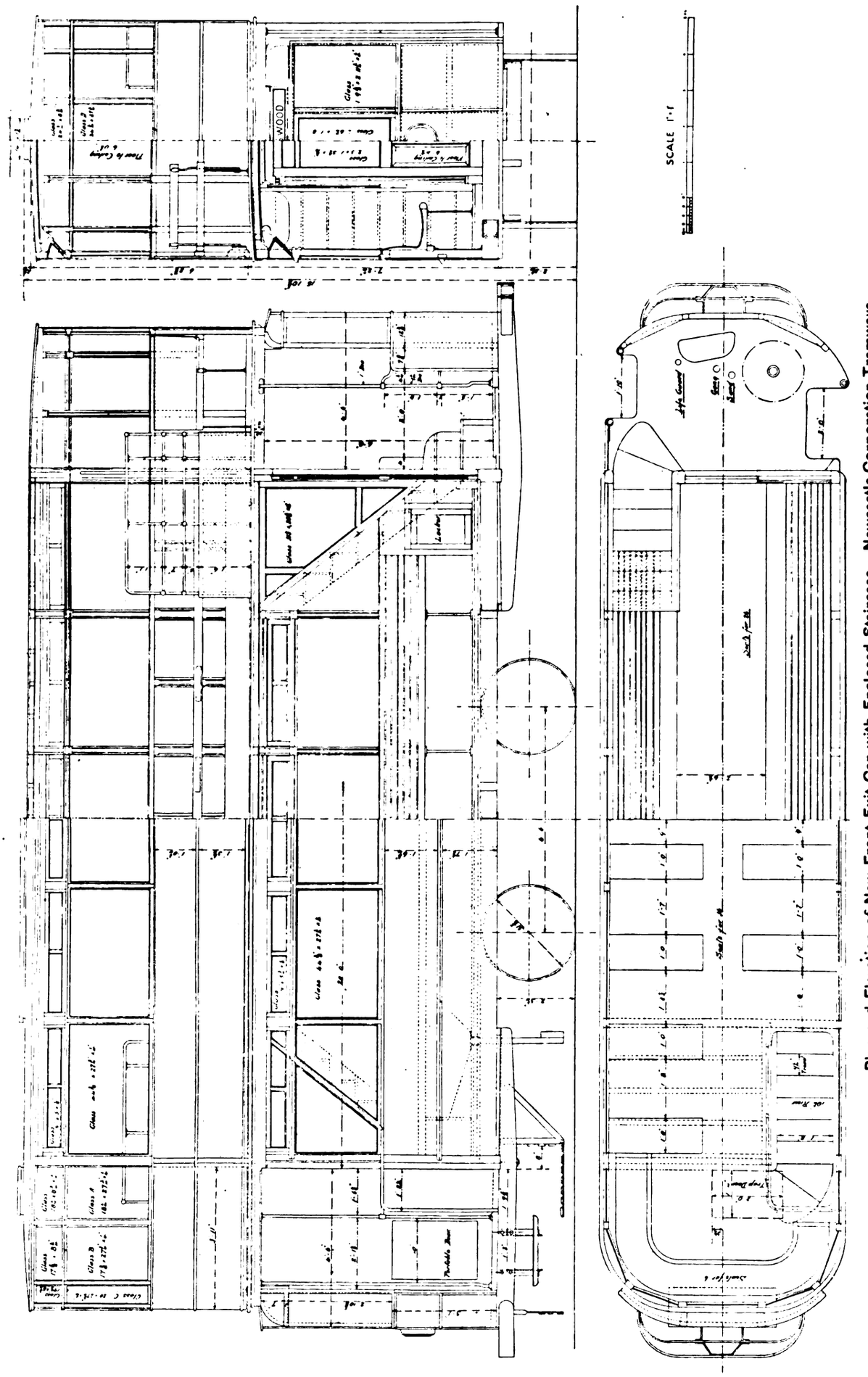

Plan and Elevation of New Front Exit Car with Enclosed Staircase.—Newcastle Corporation Tramways.

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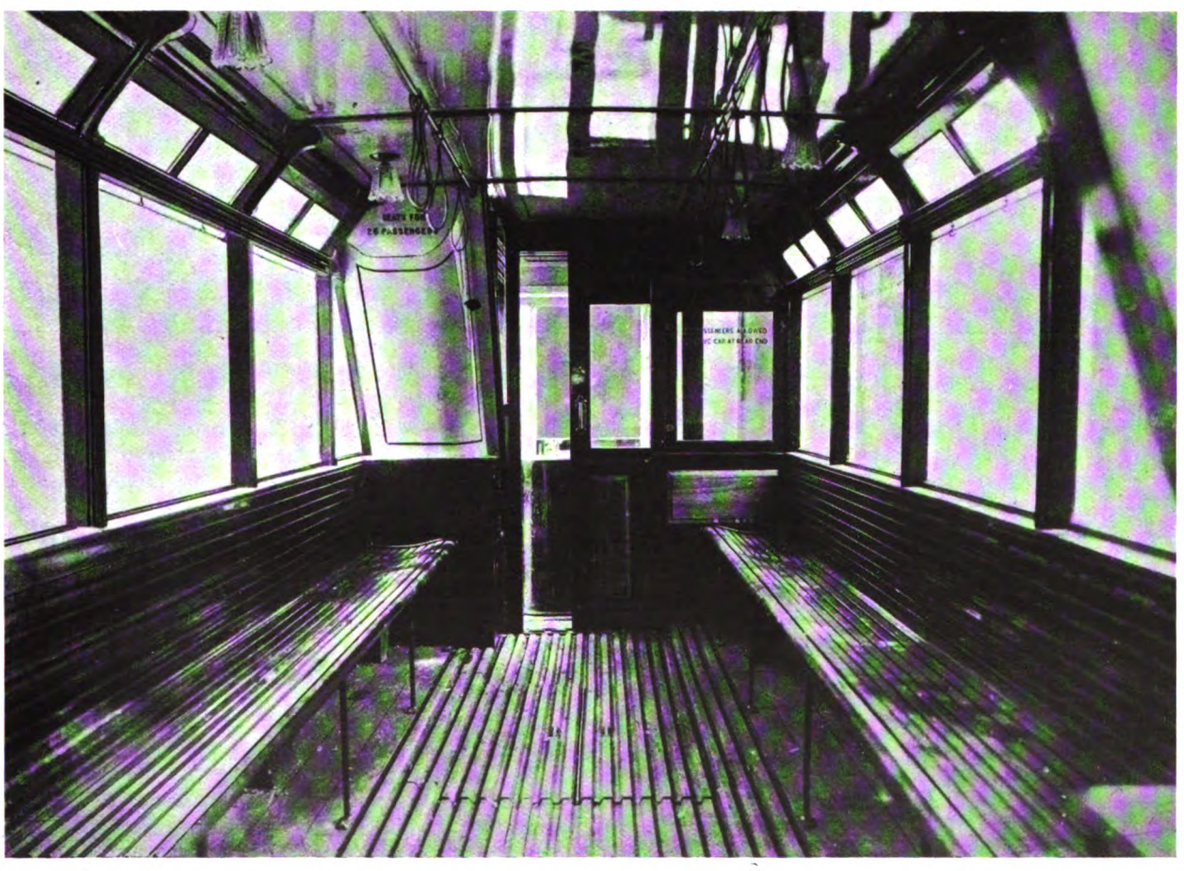
Upper Saloon.



Lower Saloon Showing Arrangement of Enclosed Staircase.

IMPROVED CAR AT NEWCASTLE.

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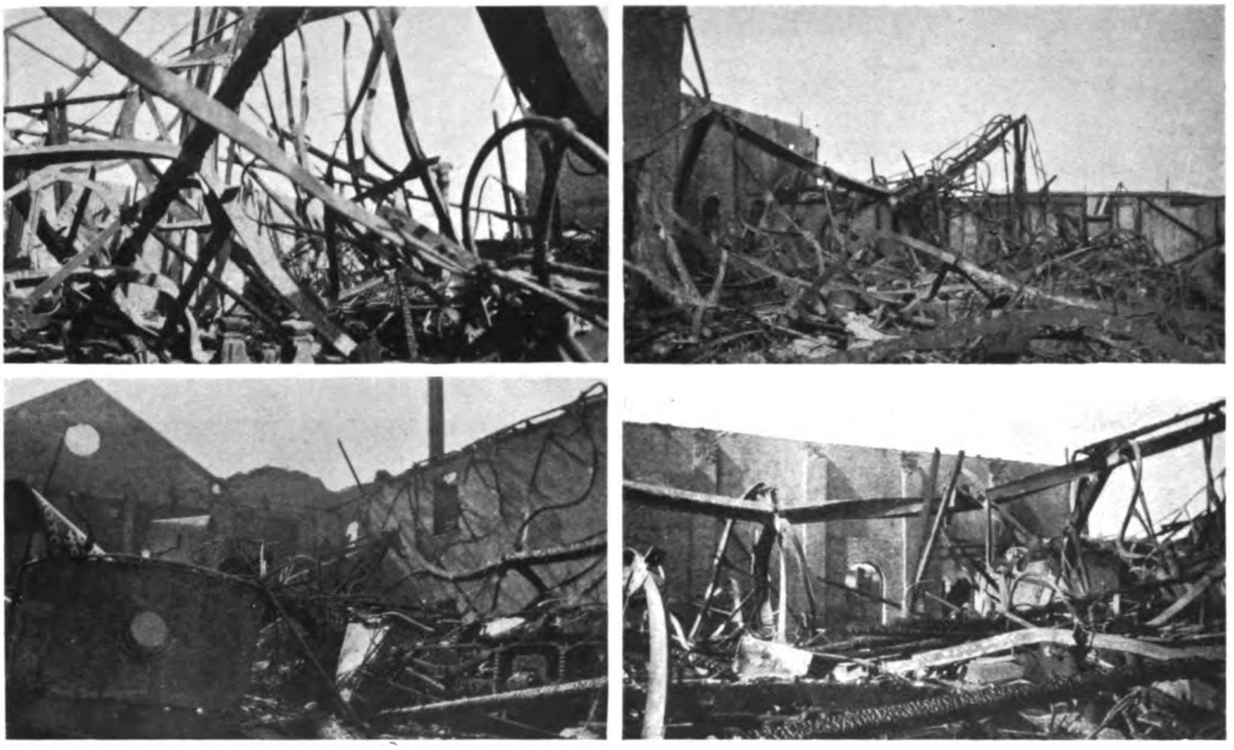
curtailed by the staircases were it not for the fact that this construction enables a longer car body to be provided. This secures greater seating accommodation as compared with a car having a body of the type hitherto constructed. On the lower deck there is a wide gangway of 2 ft. 6 in., which provides ample room for standing passengers, and there are seats for 26 persons.

In the construction of the covered top there are no frames or sliding doors as in the ordinary type of top covered cars. In the Newcastle car the whole of the top deck, as will be seen from the photograph, is entirely open and free from obstruction, thus providing greater simplicity of arrangement, while giving a roomy appearance to the saloon. On the top deck there is seating capacity for 36 passengers. The additional seating capacity here provided under dry conditions in inclement weather, compared with the existing types of top covers in general use, is another feature in this design. The additional revenue to be derived from this arrangement would no doubt quickly repay the cost of the necessary alterations to existing rolling stock, and it also has the great advantage of giving the conductor more freedom of action, leaving more time for the collection of fares—an undoubted gain to any tramway system. There will also be less cost in car maintenance owing to the absence of sliding doors to the top deck compartment. The design and construction of this new type of car are fully covered by letters pat nt.

The Last Horse Car Disappears from New York. The New York daily newspapers a few weeks ago made a good deal of sport over the farewell appearance of the horse car in that city. The last car had been working on a short route in the crowded "down-town" district, and in 1916 only 3,576 passengers purchased tickets, while 1,945 other passengers used the cars with transfer tickets. The total receipts were £35 12s. Last year it cost the New York Railway Company more than 6s. to carry each passenger by these cars, and on July 17, 1917, the total receipts were 5d.

DARTFORD CARS AND CAR SHED DESTROYED.

The car sheds and cars of the Dartford Tramway Company were destroyed by fire on Tuesday morning, August 7. The fire was first observed about 3 a.m., and although the fire brigade arrived within a few minutes the whole building and its contents were demolished. Of the twelve cars nothing remained but a tangled mass of metal. The origin of the fire is unknown. The night man, who left at midnight, after the last car had been run in, stated that the buildings were then closed and the electric current shut off. Until recently a military guard was stationed at the car sheds, as the cars carry great numbers of munition workers. The Dartford tramways are owned by the Urban Council, which supplies current for the cars, but the undertaking is leased to and worked by Messrs. Balfour, Beatty and Company, under an agreement expiring in 1921.



All that Remained of Twelve Cars and the Car Sheds at Dartford.

Although the whole of the rolling stock (as shown by the accompanying illustrations) was completely destroyed, most of the important books and three days' takings from the tramways were saved.

The company's first concern was the provision of facilities for the large number of munition and other workers in the district. Fortunately the day following was a holiday, which gave the manager, Mr. F. A. Kincaid Fergusson, in conjunction with the manager of the neighbouring system at Bexley Heath, Mr. H. P. Stokes, and Messrs. Vickers, Limited, an opportunity of making the necessary arrangements for providing a service on the Wednesday morning, which service was fully maintained and is now running smoothly. A meeting between Messrs. Balfour, Beatty and Company and the Local Councils of Dartford and Bexley Heath was held, at which it was agreed that for the following month the Dartford undertaking should be operated by the Bexley Heath Council tramway undertaking pending arrangements for the future operation.

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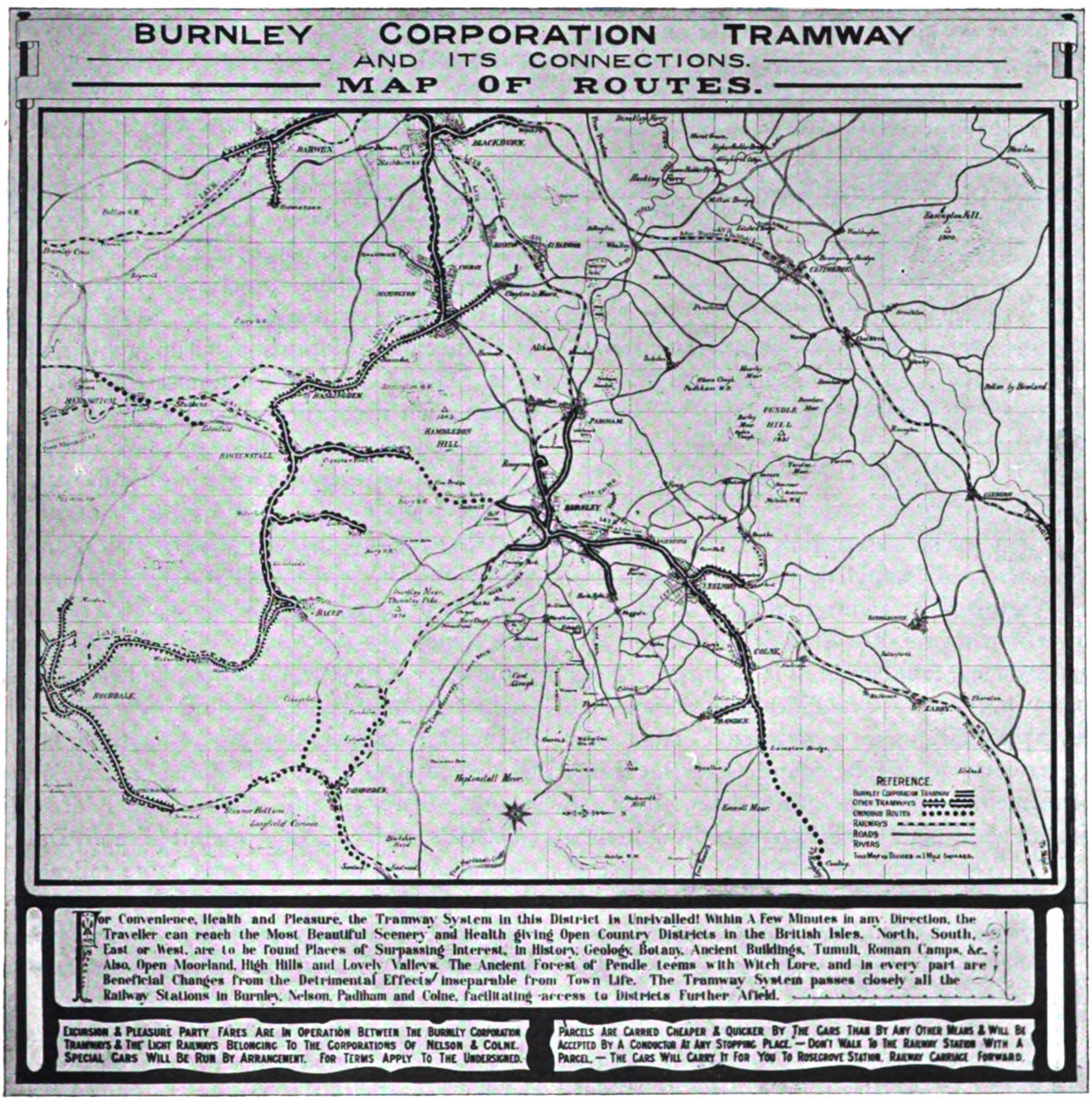
TRAFFIC DEVELOPMENT AT BURNLEY.

In sending to us the map which is reproduced on this page, Mr. Henry Mozley, general manager of the Burnley Corporation Tramways, writes :—The success of a tramway undertaking from a financial point of view necessarily depends upon the income rather than the expenditure. Whilst there is almost unlimited scope for the development of income, the restriction of expenditure is not so easily controlled, depending as it does upon certain economic laws and municipal policy beyond the control of the expert.

In recent years advertising in different forms has developed, but I wish now to call attention to the advantages of cartoon maps in permanent form now being so commonly used by railway companies, illustrating the railways and their connections, and the facilities which they afford for travelling from place to place. Following on these lines I have caused a map to be prepared showing the Burnley Corporation Tramways and their connections in the immediate vicinity as well as those farther afield. This map has been prepared from official sources, and is to scale, and extends to a district 25 miles square. It has been mounted on a wooden frame, and properly preserved with suitable colours and varnished it should with ordinary care last many years.

The dimensions are 8 ft. 6 in. by 8 ft. 6 in., and unfortunately the map is so large we could not find a suitable place in the centre of the town. It has therefore been erected at the gable end of the old steam depot, about 1½ miles from the centre of Burnley.


BURNLEY CORPORATION TRAMWAY
AND ITS CONNECTIONS.
MAP OF ROUTES.
REFERENCE
For Convenience, Health and Pleasure, the Tramway System in this District is Unrivalled! Within A Few Minutes in any Direction, the Traveller can reach the Most Beautiful Scenery and Health giving Open Country Districts in the British Isles, North, South, East or West, are to be found Places of Surpassing Interest, in History, Geology, Botany, Ancient Buildings, Tumuli, Roman Camps, &c.; Also, Open Moorland, High Hills and Lovely Valleys. The Ancient Forest of Pendle teems with Witch Lore, and in every part are Beneficial Changes from the Detrimental Effects inseparable from Town Life. The Tramway System passes closely all the Railway Stations in Burnley, Nelson, Padiham and Colne, facilitating access to Districts Further Afield.
Excursion & Pleasure Party Fares Are In Operation Between The Burnley Corporation Tramways & The Light Railways Belonging To The Corporations Of Nelson & Colne. Special Cars Will Be Run By Arrangement. For Terms Apply To The Undersigned.
Parcels Are Carried Cheaper & Quicker By The Cars Than By Any Other Means & Will Be Accepted By A Conductor At Any Stopping Place.—Don't Walk To The Railway Station With A Parcel.—The Cars Will Carry It For You To Rosegrove Station, Railway Carriage Forward.

Notwithstanding its disadvantageous position it has been the subject of great interest, and has caused a demand for further efforts in this direction. Before long it is hoped to reproduce the map, together with suggested routes for excursion parties, etc., on a card of a suitable size for the pocket.

London School of Economics.—For the session of 1917-18 a comprehensive course of lectures has been arranged on railway and cognate subjects. Sir George Gibb will open the session on October 10 with a lecture on the science of transportation. Technics, economics, and finance are all dealt with in the lectures which are to follow.

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LONDON, SEPTEMBER 13, 1917.

A Far Eastern Tramway.

The description of the tramways of Shanghai, which is given elsewhere in this issue, shows that broadly speaking the arrangements are similar to those with which we are familiar in this country. There are, however, certain modifications designed to suit the conditions in a crowded Chinese city. In particular it will be found that the traffic arrangements and the fares have been so adjusted as to meet conditions wholly unknown in the West, and that despite the adverse circumstances the undertaking is able to pay good dividends. The Shanghai streets are sometimes narrow, but they are fairly level, and trailer cars are very largely employed without difficulty. The use of the trailer has, in fact, been one of the elements of success, as it has helped to keep down working expenses sufficiently to allow a margin of profit on lines where the receipts per car-mile are small owing to the lowness of the fares. The bulk of the population are too poor to pay what we should call a reasonable fare, and in regard to those who are better off the tramways have to stand the competition of the rickshas. Another element in the success of the undertaking is the fact that it has been found possible to cultivate a large all-day traffic. The depreciation in the value of the native currency has been a source of difficulty, but that, too, has been overcome. We have, in fact, in the Shanghai tramways another tribute to the adaptability of our race. In this case a manager trained on a British tramway has been able in a few years to build up on the other side of the world, and in such a place as Shanghai, a prosperous undertaking in spite of such adverse conditions as are quite unknown except in the far East.

Track Renewals.

The difficulty of tramway maintenance has become almost insuperable. The point was reached months ago when it became practically impossible to get new rails without a special Government certificate of authorisation. The point has now been reached when it is almost impossible to obtain such a certificate even where it can be shown that tramways necessary for munitions work are urgently in need of renewal. A further stage is that if and when a certificate has been granted the question still remains, where and when can the rails be obtained? Delivery being secured, there is still the difficulty of getting the necessary labour, skilled and unskilled. At every turn the manager and the engineer are bemused and worried. The financial side has also to be considered. If there is a prospect of obtaining materials and labour, there is still the question of their enormous cost at the present time. During the three years of the war a large mileage of tramway track became due for renewal, and under peace conditions the renewal would doubtless have been carried out. Instead of that, managers have to use every other expedient to prevent the track from going to pieces. The effects on the rolling stock and on the temper of the passengers are alike lamentable. Tramway officers no doubt reflect that things are different in the case of railways. There also difficulties occur in getting new rails, but as the railways are under direct Government control, and are recognised as indispensable for the carrying on of the war, these difficulties tend to be less acute. The same thing applies to a certain extent to the problem of labour, and besides that much less labour is required

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to relay railway track than tramway track. The former, indeed, is a much simpler task from many aspects. There is the further consideration that defective railway track is more apt to lead to serious accidents and loss of life than is defective tramway track. Thus the railways have a stronger plea of absolute necessity. Apart from these things, when one head of a railway rail is worn, comparatively little labour and expense are required to invert it, and at once there is a new running surface. If that has been exhausted, the rail can be lifted, taken into the shops, planed true, and then replaced. Where trains are not excessively frequent the traffic in the interval can all be conducted on the other track past the place where repairs are going on. Joints do not get into a hopeless condition, because they are easy of access and the fishplate bolts are regularly kept screwed up tight. In none of the operations is there any paving to disturb. It appears likely that until supplies of new tramway rails at reasonable prices are available more recourse will have to be had to planing and re-shaping the tramway rail head *in situ*. It is hopeless to think of tearing up the street surface, taking away the rails to the shops, planing them, and then re-laying them. The foundations would be disturbed, the street surface would be open for some time, and in few if any tramway shops would be found planing machines capable of the work. The rail head must be planed and milled and cut to proper shape without disturbing it in its bed. This has already been satisfactorily done in a few towns by a method which was favourably noted in these columns several years ago. Recently some improvements have been made in the machines required, and a demonstration of the process was given a week or two ago at Bolton to representatives from a number of tramways. The value of the invention is now generally acknowledged. Unless, indeed, the rails are hopelessly worn out before the remedy is applied, the process is undoubtedly capable of adding several years to their life.

The Special Librarian. In the United States within the past few years the practice has been considerably developed among important manufacturing and trading companies of forming substantial libraries for the use of their staffs. There can be no doubt of their utility even when they are of modest dimensions. These special libraries are composed of periodicals, pamphlets, books, and reports dealing with the industry or industries in which the company is engaged, and with allied industries. The object is to secure and to have at call a storehouse of information of every kind which has any bearing on the business. There is not very much use of possessing such a storehouse, however, unless there is also a keeper with a key for unlocking it and with such a knowledge of the contents that he can direct the inquirer to the particular items he requires without loss of time, and, so to speak, spread the table ready for him in the shape of all the books and articles bearing on the point in regard to which information is desired. This librarian also has, or ought to have, the task of keeping the library up to date—in these days an almost continuous task. The duties of such a librarian were recently sketched by Mr. M. C. Brush, president of the Boston Elevated Railway Company, in an address delivered before the Special Libraries Association at Louisville. The work and the qualifications of this specialised librarian were placed by Mr. Brush so high that one is inclined to think that an Admirable Crichton would be required if the post was to be properly filled. Yet it is wise to plan largely and even to set the ideal beyond reach. Among other things Mr. Brush said that the employees of a company should feel confident that once the librarian knows their needs he will continue to find matter on the subject until directed to stop, that if new ideas on an old subject come to hand they will be advised of them, and that the librarian should be in fact an assistant both to the staff and the executive. The librarian is to keep himself in a position to be useful by calling on the staff periodically, thus keeping in touch with the work so as to be on the look out for articles in newspapers, periodicals, etc., bearing on the different problems in hand. "The librarian," adds Mr. Bush, "must instinctively know what subjects are bound to come up for discussion at some future time, and accumulate material to aid the executive in the proper study of the question with the least amount of time. The material should not

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consist of stacks of books or pamphlets dumped upon his desk to such an extent that the executive groans at the sight of the job before him, but should consist of specially marked pages or paragraphs in books, reviews, etc., bearing directly on the subject." The librarian should also "demonstrate his ability to advise how various questions have been viewed by different minds, and report why certain schemes were a success or a failure." It is no wonder Mr. Brush concluded his address by suggesting that a more fitting title than that of librarian could be found for the genius who, with ever fresh enterprise, zeal, and industry would carry out the multifarious and exacting duties of the office.

TRAFFIC CONGESTION IN MANCHESTER.

NEW TRAMWAY ROUTES.

The question of the best means for relieving street traffic congestion in Manchester has been before the Corporation for several years. Some considerable time ago the Tramways Committee, the Watch Committee, and the Improvement Committee, acting on instructions, made separate investigations into the subject, and presented reports. The Tramways Committee sent a deputation, including Mr. J. M. McElroy, the general manager, to America and to the Continent of Europe to examine traffic conditions in foreign cities. The Watch Committee also sent representatives to the Continent. After the three reports had been presented the Corporation appointed a Traffic Congestion Special Committee to consider the reports and make final recommendations to the Council.

The Special Committee have presented their report. In this they lay emphasis on the need for new trunk tramway routes and additional tramway termini. They also agree that Parliamentary powers should be obtained to enable the police more effectively to regulate street traffic. In regard to the Tramways Committee's proposal that a tramway terminus should be established on the old Infirmary site in Piccadilly, they say that a widening and lengthening of Parker Street would give all the room needed.

The Special Committee do not bind themselves to details, but give a list of proposed tramway routes:—

No. 1.—A widening of Aytoun Street and a proposed new road in continuation of Aytoun Street to join London Road at its junction with Whitworth Street.

No. 2.—A proposed new road commencing where the above new road crosses Auburn Street, and passing thence to the junction of Chorlton Street and Whitworth Street, and from there behind the School of Technology to Temple Street, along Temple Street and Higher Temple Street to Brunswick Street, and thence along a new road to Stockport Road.

No. 3.—Commencing at Altrincham Street by a junction with Route No. 2, passing along a widened Altrincham Street and Charles Street to York Street, thence along York Street to Rusholme Road, and joining the existing trunk road (Oxford Road).

No. 4.—From City Road along Medlock Street to Stretford Road, thence along a widened Upper Medlock Street to its junction with South Street, and along a proposed new road running in a south-westerly direction to Greenhill Street, crossing that street and passing along a widened Linwood Street, terminating in Bradshaw Street.

No. 5.—Commencing at Whitworth Street West, along Lower Cambridge Street and Higher Cambridge Street to Coupland Street, thence along two new roads to join up with Lloyd Street and Carter Street.

No. 6.—Commencing from Stretford Road, passing along a widened Upper Jackson Street to a widened Boston Street.

The six termini proposed by the Tramways Committee were as follow:—The old Infirmary site, Albert Square, St. Peter's Square, Marsden Square, Cannon Street (Corporation Street), and a re-arrangement of the existing teminus in Stevenson Square. The Special Committee say that, while not committing themselves to details, they are of opinion that these termini are absolutely necessary, not only as a means of meeting the constantly growing demands of the tramway traffic, but also as a means of lessening the general traffic congestion in the central area of the city.

The Committee think that the Royal Infirmary Old Site Special Committee should prepare a scheme for dealing with the site, so that any building erected would be architecturally worthy of such an important situation, and harmonise with gardens and open spaces around.

In regard to certain other proposals made by the Tramways Committee, the Special Committee are satisfied that the proposed new street connecting St. Peter's Square with Albert Square is not essential. As regards the proposal for the widening of Fountain Street, they think that in view of the immense outlay which would be involved in carrying it out the proposal should be abandoned.

The Special Committee express agreement with the view put forward by the Tramways Committee that as the arrangement with the Salford Corporation terminates on May 4, 1924, it is not expedient to make any definite proposals at the present time as regards Deansgate and the provision of a tramway terminus on that side of the city. Negotiations should be opened with the Salford Corporation with a view to coming to some new arrangement as to the future working of the two tramway systems so as to effect improvements in the general interest.

Discussing future requirements, the Special Committee say that steps should be taken to provide additional arterial routes, giving quick and convenient access to the heart of the city. In considering the requirements for passenger transport they had in mind not simply the present form of surface transit—tramways—but the possibility of other forms of passenger transport being developed in the future. It should, however, be clearly understood that, whatever form of surface transit may come along, more street accommodation in the shape of new arterial routes is urgently required.

The congestion caused by the ordinary vehicular traffic in the central parts of the city has been considerably reduced since the outbreak of war, and as the method of traction is undergoing considerable change, it is probable that after the war a large proportion of the merchandise transport formerly dealt with by horse haulage will be dealt with by motor traction, which is more mobile, and tends less to congestion than the slower-going horse traffic. This would have the effect of making the general congestion of all classes of traffic in the heart of the city less acute in the immediate future than it was before the outbreak of war, and if the ordinary vehicular traffic alone, apart from the tramway traffic, had to be considered, it would probably not be necessary to incur any expenditure to meet the difficulties for some years to come.

In closing, the Special Committee point out that it is not suggested that all the proposals should be carried out at the present time, nor yet in the immediate future. Some parts of the scheme are more urgent than others, and these should have priority, but it is important that any portion of the scheme should be considered as only a part of a general plan ultimately to be dealt with.

REMODELLED RAILS AT BOLTON.

On the invitation of the Woods-Gilbert Rail Grinding and Milling Company, a number of tramway committeemen, managers, engineers, and others interested made an inspection on August 22 of the work now going on in Bolton, under the supervision of Mr. E. Ll. Morgan, borough engineer, remodelling the heads of worn rails by means of the machine with which the company's name is associated. In our issue of August 10 last, particulars of this and of similar work elsewhere were given. Two of the Woods-Gilbert machines are in use in Bolton, removing corrugations, deepening the grooves, and repairing joints. As previously explained, a good deal of the Bolton track is due for renewal. Under war conditions new rails cannot be got, and it is expected that the remodelling of the existing rails will add several years to the life of the track.

The visitors were taken in special cars, provided by the courtesy of the tramway manager, Mr. J. Barnard, to Derby Street and Lostock, where the machines were at work, one being engaged in deepening the groove and the other in grinding the tread. After the demonstration the visitors were entertained to tea, when various speakers briefly expressed much satisfaction with what they had seen, and also their appreciation of the value of the process at a time when tramway authorities were getting into a state of desperation over the subject of track renewal. Councillor Higham, vice-chairman of Blackburn Corporation Tramways Committee, said that but for the machine tramway authorities would have had to take up some part of their tracks to obtain rails to repair other parts. Alderman Lindsay, chairman of the Salford Tramways Committee, and Councillor P. Higson, vice-chairman of the Bolton Tramways Committee, also spoke of the useful work that had been done in various towns. The Woods-Gilbert Company were thanked for having afforded the visitors the opportunity of seeing the machines at work. The company were represented by Messrs. J. Cameron, chairman, J. W. Eunson, engineer, and A. E. Conway, secretary.

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SERIOUS ACCIDENT AT DOVER.

One of the most serious tramway accidents which has ever occurred in this country took place at Dover on August 12, resulting in eleven people being killed and a large number injured. A Corporation tramcar with about 50 passengers was on its way from Dover to River Village. When it was descending the steep gradient from Crabble Hill to the Athletic Ground, the car got out of control, left the rails, and dashed into a wall at the foot of the hill. The peril to the passengers was intensified by the car overturning after the collision. Some of the top deck passengers were violently thrown off, and all on board were severely cannoned about. Ten passengers were killed on the spot, and among the survivors were some who were very seriously injured. Among the killed were Councillor Joseph, of Folkestone; Mr. Axford, chief clerk of the Dover electricity department; and Miss Lettie Scrace, the conductor of the car. The driver (Brissenden) jumped at the last moment and escaped with minor injuries.

The Dover tramway system, though it possesses a good many gradients, has hitherto been immune from serious accidents. It began operation as long ago as 1897, and was the second municipal electric tramway to be opened in this country, the first being Leeds.

Colonel Pringle held a Board of Trade inquiry into the accident on August 24. The first witness was Mr. Edward Carden, the tramway manager, who said that the River section of the tramways was opened on October 2, 1905. Since then there had not been the slightest trouble on the gradient, which was 1 in 10. The cars were fitted with the ordinary hand brake, electric brake, and the Spencer slipper brake. Under the Board of Trade rules all cars had to stop at the junction of London Road and Crabble Hill. The maximum speed on the hill was to be four miles an hour, and that speed had always been observed. The driver of the car which overturned was taken into service on July 21. He was put under instruction, and he showed that he was exceedingly alert. He had been discharged from the army on June 1 on account of nervous breakdown caused by heat in Egypt. This driver was under instruction for nine days. He first took a car out by himself on August 1 as a regular driver. At the time of the accident he had been driving over the River route for only four days. On the River route the cars were only allowed to carry the number of passengers who could be seated. According to the police, a greater number had been on the car at the time in question. Special instructions had been given that no passenger should stand on the top deck.

E. H. Nye, depot mechanic, testified that the car and brakes were in good order when sent out on the day of the accident. The slipper brake was not used except in case of emergency.

Several passengers testified to the car not stopping at the top of the hill, and described the runaway and the overturn.

W. Knott, a mechanic from the Maxton depot, said he examined the car controller after the accident, and found that the handle was full open for going ahead. There were, however, some children in the car. The slipper brake block looked as if it had been applied.

A. J. Bissenden, the driver of the car, said that he had taken cars down the hill ten times in all when alone and 24 times with others, and he had never found any difficulty. When he got to the top of the hill on the day of the accident he threw off the controller and put on the hand brake, but found that it would not hold. He then tried to put on the slipper brake, but the car was picking up speed so quickly that it would not hold. He tried to get the emergency brake to work, but it would not. As he found he could do nothing else, he jumped off.

The inquiry was closed.

The coroner's inquest was spread over several days. On August 27 the manager said that the tramway service in twenty years had carried 60,000,000 passengers, and that there had never before been a fatal accident to a passenger. On August 29 the jury returned a verdict finding that the accident was due to an error in judgment on the part of the driver, whom they considered was too inexperienced. It appeared that he was an invalided soldier, and had been driving for only a few weeks.

INCREASE IN LONDON RAILWAY FARES.

On September 1 certain local and through fares were raised on the District, Metropolitan, London Electric, and Central London railways, the Great Northern and City, and the East London lines. No change has taken place in fares where the recent 50 per cent. increase is already effective. In the majority of cases the increase of fares is either a halfpenny or a penny.

On the District Railway the penny fares remain unchanged, except on the section between the Mansion House and Charing Cross, where the new fare will be three-halfpence. On the Hampstead, Bakerloo, and the City and South London railways the local fares will not be changed, but certain increases will apply in the case of journeys involving a transfer.

The necessity for a revision of fares has arisen, it is stated, owing to the increased cost of maintenance and operation charges, which include the payment of a war bonus to the railway workers. It will be remembered that when the Railway Executive Committee raised fares by 50 per cent. the tube railways, which are not under Government control, retained their original fares.

In accordance with the notice given in July, a revision of omnibus fares which then took place in the north-west area has been extended to certain other motor omnibus routes.

MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The complete programme of the annual conference of the Municipal Tramways Association, which will be held at Blackpool on September 20 and 21, is as follows:—

THURSDAY, September 20.

10.45 a.m.—Meeting of the Executive Council.

11. 0 a.m.—Presidential address by Mr. Henry Mozley, general manager, Burnley Corporation Tramways.
Paper:—"Notes on Tramway Finance," by Messrs. J. Barnard, general manager, Bolton Corporation Tramways; G. W. Holford, general manager, Salford Corporation Tramways; and P. Priestly, general manager, Oldham Corporation Tramways.
Discussion to be opened by Alderman C. F. Spencer, chairman Halifax Corporation Tramways and Electricity Committee.
Discussion:—"Rule of Footpath." Subject to be introduced by Mr. J. Dalrymple, general manager, Glasgow Corporation Tramways.

1. 0 p.m.—Interval.

2.15 p.m.—Paper:—"Differentiation in Fares for Workmen and Other Passengers on Tramways," by Mr. W. Murray, Assoc.I.E.E., tramways manager, Walthamstow Urban District Council.
Discussion to be opened by Councillor J. Moon, deputy chairman, Plymouth Corporation Tramways Committee.
Discussion:—"Development of Tramways." Subject to be introduced by Mr. Arthur Ellis, M.I.Mech.E., city electrical engineer and tramways manager, Cardiff.

FRIDAY, September 22.

10. 0 a.m.—Meeting of the Executive Council.

10.30 a.m.—Meeting of managers' section.

10.50 a.m.—Extraordinary general meeting to confirm alterations to Articles of Association.

11. 0 a.m.—Annual general meeting.

The headquarters of the association will be at the Savoy Hydro, North Shore, Blackpool, where the meetings will take place.

The officers for the current year are as follows:—

PRESIDENT:
Henry Mozley, Burnley.

VICE-PRESIDENT:
Ald. S. Flint, J.P., Leicester.

PAST PRESIDENTS:
P. Fisher, Dundee; Ald. H. Linsley, J.P., Salford; A. R. Fearnley, Sheffield.

COUNCIL:
A. Baker (past president), Birmingham.
W. Clough, Bury.
Sir J. W. Courtis, J.P., Cardiff.
J. Dalrymple (past president), Glasgow.
A. L. C. Fell (past president), London.
T. B. Goodyer, Croydon.
J. B. Hamilton (past president), Leeds.
Councillor E. Heap, Burnley.
G. W. Holford, Salford.
W. J. McCombe, Hull.
J. M. McElroy (past president), Manchester.
Ald. C. F. Spencer, Halifax.

HON. SOLICITORS:
E. R. Pickmere, Town Clerk, Liverpool.
S. F. James, Town Clerk, Ilkeston.

HON. SECRETARY AND TREASURER (*pro tem.*):
A. R. Fearnley, Sheffield.

Ipswich Cars to be Painted Grey.—Mr. Frank Ayton, general manager and engineer of Ipswich Corporation Tramways, informs us that in order to save time and expense in the maintenance of the cars, and also in view of the frequent collisions between cars and other vehicles in the streets, owing to the absence of street lighting, the Corporation have decided that, for the remaining period of the war, the fancy painting of the cars shall be abandoned, and that in place thereof the cars shall be painted two shades of grey with a limited amount of black lining.

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THE "EVER READY" SANDING GEAR.

Many have been the endeavours in the tramway world to devise a really satisfactory device for sanding the rails. In theory it would appear so simple an operation to convey sand from a receptacle upon the car to the rails, but those who have had any practical experience with the subject know only too well that the matter teems with difficulties. The very nature of sand in its pure state gives it a tendency to clog, a fact which must have been of considerable concern to our forefathers in the design of the hour-glass. When, however, we have to deal with the commercial sand used upon a tramcar, we incur greater difficulties, for we encounter not only sand in varying degrees of fineness and moisture, but also

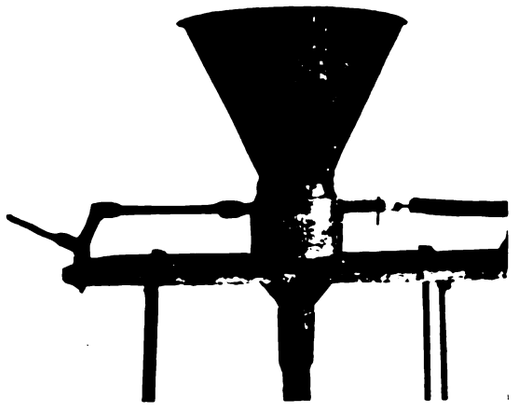

Fig. 1.—Sanding Gear.

containing foreign substances. In addition to this we have another trouble, which occurs at the end of the pipe or duct where the sand emerges before falling on the rail. Owing to its necessarily low position the pipe frequently becomes choked with mud, and on rainy days is subject to a continuous spray of wet from the wheels. The consequence is that when the driver wishes to convey sand to the rails he frequently finds the duct completely obstructed with mud, or an accumulation of wet sand which is only with difficulty removed.

The efficient sanding of the rails is a matter of serious concern, especially upon hilly routes. Any defect in operation may lead to a costly accident. Especially is this fact of great importance at the present time, when many of our drivers are comparatively new to their jobs. The existence of an efficient sanding gear will often give them the confidence which they otherwise lack.

A practical solution for these difficulties is now claimed for a gear recently put upon the market, and known as "Ever Ready." It has been designed by a competent engineer, thoroughly conversant with all the details arising in actual practice.

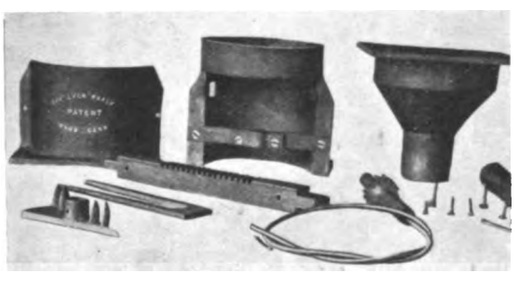

Fig. 2.—Parts of Sanding Gear.

Of the three illustrations accompanying this description, Fig. 1 shows an external view of the apparatus, Fig. 2 a view of the gear unassembled, and Fig. 3 a section of the working parts. The principle of the whole device is to prevent clogging of the sand by providing rotary motion, not only within the hopper carrying the supply of sand, but also throughout the duct, and at the exit orifice especially. To gain this rotary motion from the usual form of pedal gear a rack and pinion are employed. This is best seen in Fig. 2. The body of the gear consists of a circular iron box cast in two halves. This box contains a central vertical spindle carried in two bearings, one being formed in the upper cover of the chamber and the other carried on a cross-bar. The spindle carries a small pinion, which gears into the teeth of a rack carried upon a sliding bar. This bar is provided with draw rods, so that it may be moved from the standard form of pedal gear upon the driving platform. A spring is provided to return the bar after its movement. By this means reciprocating rotary motion is given to the vertical spindle.

The top of the vertical spindle projects into the base of the hopper, and carries a circular plate as shown at the top in Fig. 3. This plate is provided with a series of spikes, so that the rotary motion tends to break up the sand at the base of the hopper, and the plate, having sharp bevelled edges, cuts in pieces any tickets, paper, or bits of waste, etc., that might otherwise obstruct the valve hole, and so enables them to pass through it freely with the sand. Further, this plate forms the valve by covering the hole when the pedal is at rest.

Attached to the lower end of the vertical spindle there is a length of flexible steel cable, which extends throughout the duct leading to the rail. This cable terminates in a fork-shaped piece immediately within the exit orifice, and provides rotary clearing motion at this important point, and so ensures a certain and free exit for sand and other material.

Every contingency of sand clogging has been provided for. The gear is applicable to either single or double truck cars. We understand that the "Ever Ready" gear has already been in trial use for some months upon an important tramway system, where it has fully upheld all the claims put forward by its designer. Those interested in the gear can obtain further particulars from the Equipment and Engineering Company, 2 and 3, Norfolk Street, Strand, London, W.C.2, who are handling the sale of the apparatus.

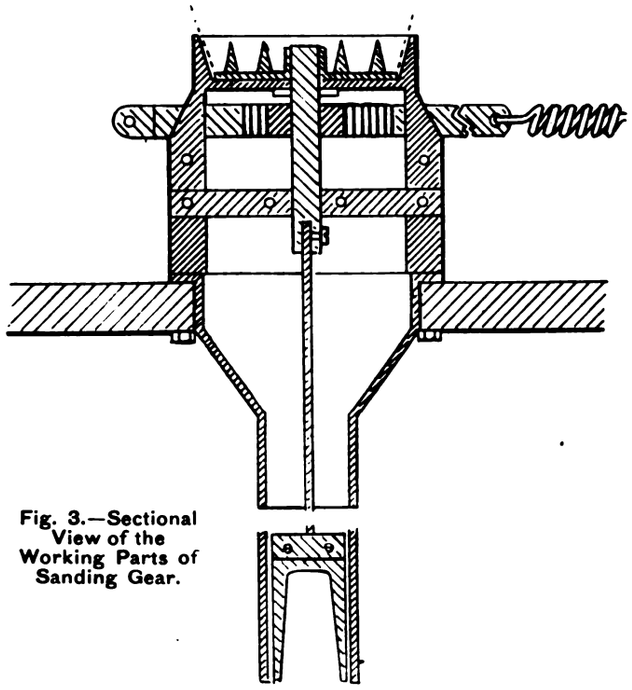

Fig. 3.—Sectional View of the Working Parts of Sanding Gear.

SHEFFIELD OMNIBUS TRAFFIC.

In the course of a discussion on Mr. Wakelam's paper dealing with extraordinary traffic, at the annual conference of the Institution of Municipal and County Engineers, Mr. W. J. Hadfield, city engineer at Sheffield, said that the paper marked a step forward in the attitude towards the motor omnibus. The author said there should be no attempt made to throttle industry or trade. In Sheffield motor omnibuses were run by the Corporation, and any profits made went to the rates. They were run not as a commercial speculation, but to get people to and from the outlying parts of the city. He did not think large profits were made anywhere outside London. Therefore it was not much use asking the motor omnibus people to make large contributions towards the rates. In the paper they came to much more moderate figures than he had previously seen. At Sheffield, though the petrol consumption was very low, there was not much margin between the total receipts and expenses; certainly nothing to allow of a contribution of 3d. per omnibus mile to the cost of the roads. Mr. Wakelam was of opinion that the steel tires of heavy motor lorries travelling with authorised loads and at regulation speeds were no more destructive to road surfaces than the indiarubber tires. Perhaps the roads mentioned were of macadam or wood, but at Sheffield, where there was a good deal of sett paving, the steel tire was the most destructive. The tire caught the end of the sett and it broke off. Macadam roads on which motor omnibuses had been running for four years, 80 journeys a day, showed no signs of damage. On an undulating road the greatest damage was where the omnibuses got up speed at the bottom level. He had no doubt that was due to the excessive speed at that point. He had water-bound roads and tar-bound roads over which motor omnibuses had run for four years without complaint.

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GLASGOW TRAMWAYS' PROSPERITY.

The fact that Glasgow Corporation Tramway undertaking is now free of capital indebtedness has attracted the attention of some of the financial and general engineering journals, and much praise is bestowed on the management and direction. Under the heading of "A Record of Success in Municipal Tramways," *Engineering*, devoted a leader to the Glasgow accounts, and to the reasons for the great financial success which has been achieved. In dealing with reasons, the journal points out that there are no tube railways, and the suburban lines of the railway companies are not operated electrically. Moreover, the street paving is not suitable for motor omnibuses; in any case the Corporation have prohibited the working of these. The cab traffic is limited, partly owing to the rate being 1s. per mile. The tramways traverse nearly all the main thoroughfares, and a passenger in the city area need not walk more than 100 or 200 yards to get a car. Apart from these and other things, it is admitted that the fares are commendable. Analysing the favourable traffic receipts, *Engineering* gives the opinion that they are due to the relatively small competitive transport facilities provided. On the other hand, credit is given for the relatively economical working expenses, and the conclusion is that Glasgow has every reason to be proud of the financial condition of the Corporation tramways.

The *Economist*, in dealing more briefly with the matter, adopts a whimsical vein. It says:—"The pathetic attempts of the department to sweat down the amount of its profit which it hands over to what is known as the Common Good are worthy of study. Though the sinking fund amounts to £3,612,838, and equals the total capital expenditure, it is increased by the transfer of £114,378. The depreciation fund receives £34,049 and the permanent way renewals fund £39,255. After paying income-tax and interest on capital (which is balanced by interest received on investments) and various odds and ends, the Common Good is presented with £160,985. We see hard times before the Tramways Committee of the Glasgow Corporation. When the war ends, the payments to dependants of employees cease, and cost of working decreases, all the ingenious financial camouflage of which Scottish administrators are capable will scarcely avail to hide these profits. Yet we would be prepared to back the Tramways Committee to put up a stiff fight to keep them concealed.

DIVIDENDS.

Mansfield and District Light Railway.—An interim dividend of 3 per cent. will be paid on the ordinary shares.

Fife Tramway, Light and Power Company.—A dividend of 6 per cent., less tax, will be paid on the preference shares.

Stewarts and Lloyds, Limited.—An interim dividend has been declared for the half-year ended June 30 at the rate of 10 per cent.

Glasgow Subway Railway Company.—The directors announce an interim dividend at the rate of 2 per cent. per annum on the preference shares.

Madras Electric Tramways have declared an interim dividend on the ordinary shares for the half-year ended June 30 at the rate of 8 per cent. per annum.

Montreal Tramways Company have announced a further dividend of 2½ per cent., making up the usual distribution of 10 per cent. for the year ended June 30.

Lanarkshire Tramways Company.—An interim dividend at the rate of 6½ per cent. per annum, less tax, will be paid on the ordinary shares for the half-year ended June 30.

Chatham and District Light Railway.—An interim dividend at the rate of 6 per cent. per annum (6s. per share) has been declared on the ordinary shares for the past half-year.

Lancashire Dynamo and Motor Company, Limited.—A dividend of 2½ per cent., free of tax, has been declared, making 12½ per cent. for the year, the same as the rate paid for 1915.

Para Electric Tramways and Lighting Company, Limited.—An interim dividend at the rate of 6 per cent. per annum (6s. per share), less tax, will be paid on the ordinary shares for the past half-year.

Oldham, Ashton and Hyde Electric Tramway Company.—The directors announce an interim dividend at the rate of 5 per cent. per annum (6d. per share) on the ordinary shares for the past half-year.

Blackpool and Fleetwood Tramroad Company.—An interim dividend of 4 per cent. per annum (4s. per share) on the ordinary shares, free of income-tax, has been declared for the half-year. A year ago the dividend was at the same rate.

Bolckow, Vaughan and Company.—The directors announce a further dividend of 8½ per cent., less income-tax, making the total return for the year 12 per cent. The corresponding payment a year ago was 8 per cent., and the year's dividend 11 per cent.

The Workington Iron and Steel Company, Limited, have declared a dividend for the year ended June 30 last on the ordinary shares of 7 per cent., making 10 per cent. for the year, less tax, and the usual preference dividend. The rates are the same as a year ago.

Leicester Tramways Committee have resolved to resume the publication of their weekly traffic returns.

FINANCIAL REPORTS AND MEETINGS.

Millars' Timber and Trading Company.—The profits for 1916 were £48,164, and £50,811 was brought forward. Debenture interest and sinking fund charges absorbed £21,920, and the dividend on the preference shares for the half-year ended June 30, 1916, amounted to £25,500, leaving £36,537, which the directors propose to carry forward.

Loss on the Accrington Tramways.—At the monthly meeting of Accrington Town Council, Alderman Higham, alluding to the loss of £976 on the tramways during the past year, pointed out that no one could say what would happen in the future, but the receipts at present were indicative of a deficit during the next twelve months. The Electricity and Tramways Committee were unable to do anything in the way of economising either in the matter of wages or other items, and their only hope was in increased receipts in order to avoid a loss next year.

Northampton Corporation Tramways.—The accounts for the year ended March 31 last show that the total revenue was £38,258, compared with £38,076 in the previous year. This is equal to 12·11d. per car-mile, as against 11·7d. The working expenses came to £29,015, (9·16d. per car-mile) compared with £24,130 (7·4d. per car-mile). The increase in working expenses per car-mile are mainly under the heads of general repairs and maintenance, and power expenses. After meeting capital charges and allowing £1,625 for the reserve fund, there is a deficit of £3,004. The passengers numbered 9,707,456, compared with 9,936,774.

Tyneside Tramways and Tramroads Company.—The half-yearly report of the directors states that the surplus of receipts over expenses is £7,490, which, with the balance brought forward from last half-year of £664, makes a total to the credit of profit and loss account of £8,154, and after deducting interest on debentures, loans, etc., amounting to £1,012, there remains an available balance of £7,142. This profit the directors propose to appropriate as follows:—In the payment of a dividend on the preference shares at the rate of 5 per cent. per annum (less income-tax), £601; in the payment of a dividend on the ordinary shares at the rate of 4 per cent. per annum (less income-tax), £2,678; in placing to the credit of reserve for renewals, depreciation, and other contingencies, £1,000; (this, with £576 interest on investments, will increase the fund to £27,413; in placing to the credit of special reserve account, to meet contingencies, £1,000; in setting aside for the reduction of registration and formation expenses, etc., £389; leaving to be carried forward to next half-year, £1,474. The traffic receipts show an increase of £5,539, as compared with the corresponding period of last year.

Wolverhampton Corporation Tramways.—Sir Charles Mander presented the Tramways Committee's annual report at a meeting of the Corporation on August 1. The cars, he said, carried 1,700,000 more passengers than in 1916, and 10,000,000 more than in 1904. They took £6,705 more in receipts, but ran 33,000 miles less than in 1914, which was a record; 2·137d. more per car-mile had been earned, showing that the cars were overcrowded. They ought to have more cars, but could neither get the cars nor the men to drive them. The committee had given the equivalent of a 4d. rate to the town. The accounts show a gross profit of £27,538, inclusive of £1,365 from the motor chars-a-bancs. After meeting the statutory charges the following appropriations were made:—Additions and improvements, £234; maintenance and repairs suspense account, £8,183; in aid of borough rate, 1917-18, £6,580; total, £14,997. The sum of £56,645 now stands to the credit of the reserve and renewals fund. The impossibility of obtaining the necessary labour and material to do maintenance and repair work has made it imperative to suspend a large amount of ordinary work. The permanent way in particular needs a great deal of attention, also the electricity mains and telephone cables, and the committee consider it essential to set aside £8,183, which, together with £2,477 brought forward, amounts to £10,660 to meet the cost of this suspended work.

Birkenhead Corporation Tramways.—The report of Mr. C. Clarke, tramways manager, for the year ended March 31, 1917, states that the income for the past year forms a new high record, the receipts amounting to £80,747, or £7,927 more than in the previous year. The working expenses were £42,106, leaving a profit on working of £38,641, or £4,654 more than in the preceding year. Interest on capital, sinking fund, and income-tax requires £24,989, leaving a balance of £13,652, an increase of £3,082. This balance has been allocated as follows:—Reserve fund, £5,000; renewals fund, £5,832; in aid of rates, £2,820. The renewals fund has now reached £34,338, and the reserve fund £8,192. Owing to the depletion of the staff and the impossibility of obtaining sufficient labour, Mr. Clarke says that neither the permanent way nor the rolling stock are in the usual satisfactory condition, and it would be impossible to avoid heavy commitments for repair and renewal work after the war. Mr. Clarke accordingly urges the committee to build up the reserve fund to the greatest possible extent, as the conditions brought about by the war have changed all calculations as to depreciation allowances, and what may previously have been a safe figure for tramway depreciation will now have to be increased considerably. The agreement between the tramways and the electricity committees

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regarding the working of the power-station has been revised, and a sliding scale based on the price of coal, water, etc., has been agreed upon.

Kalgoorlie Electric Tramways.—At the ordinary meeting of this company in London on August 9, Mr. O. Wethered, who presided, said that the report contained little that was cheering. The period had been one of difficulty and anxiety, and they could not hope for improvement until after the end of the war. The mines, on which the prosperity of Kalgoorlie necessarily depended, were passing through a very trying time. The Chamber of Mines' quarterly statement to June, 1916, showed that there were 1,331 fewer men employed on the mines than for the corresponding period for the year before. The men at Kalgoorlie were demanding higher wages with threats of strikes if their demands were not acceded to. The demands made on this company were such that they could not agree to them. A good many conferences took place, but the men declined the company's offer, and insisted upon their claims being decided by the court. The matter had not yet been dealt with, but there was no doubt that some of their demands would be granted. Unlike other businesses, it was not possible for the company to call on the public to share part of the extra expenses, and although the cost of every article used in the running and upkeep of the tramway might be doubled or trebled, the fares must remain the same, and, whatever the extra cost, the tramways must run according to schedule. The completion of the Trans-continental Railway might favourably affect the situation, but some good discovery of gold in the district would do far more. Meanwhile the directors are doing their best to reduce costs to the lowest figure. The report was adopted.

Aberdeen Corporation Tramways.—In his report for the year ended May 31, 1917, Mr. R. S. Pilcher, the general manager, presents very satisfactory results. The total revenue for the year amounted to £100,073, an increase of £5,745, the highest figure yet obtained. Much difficulty has been experienced in coping with the traffic, and at times the whole of the cars have been in service. More cars are required, but there is little hope that these can be obtained until hostilities are over. The working expenses amounted to £64,026, an increase of £5,828, due to the rise in wages and the increased cost of materials. The profit, after payment of interest, sinking fund, and allowances for depreciation and renewals, amounted to £8,763, a decrease of £933 compared with last year. Of this amount the Corporation have carried £5,842 to the reserve account, and contributed £2,921 to the city funds. In spite of the higher cost of operation, the Corporation have not found it necessary to increase the fares. Owing to the scarcity of men, 137 women have been employed—5 as drivers, 118 as conductors, 13 as clerks, and one as an inspector. The total number of employees who have joined the forces is 177, or 69·35 per cent. of the total male staff. The allowances paid to dependants during the year amount to £4,029. The car-mileage was 2,033,793, an increase of 65,178 miles; and the number of passengers carried was 28,623,659, an increase of 2,029,929. The energy consumption per car-mile amounted to 1·251 units, and the cost per unit was ·839d., or 1·050d. per car-mile. The total revenue per car-mile was 11·81d., and the working expenses 7·55d., or 63·98 per cent. of the income.

CONTRACTS AND ORDERS.

The J. G. Brill Company have received an order from Southend Town Council for castings and journal boxes.

The British Thomson-Houston Company, Limited, are supplying switchgear for the power-station extension of Rotherham Corporation, at £10,945.

Sheffield Town Council have accepted the tender of Dewhurst's Engineering Company, Limited, and of the Stirling Boiler Company, each for 500 steel boiler tubes.

Rotherham Town Council have accepted the tender of Babcock and Wilcox, Limited, at £150,500, for six boilers required for the extension of the new power-station.

Ferranti, Limited, are to supply four single-phase 2,085-K.V.A. transformers to Rotherham Corporation, and one 250-K.V.A. three-phase transformer to Salford Corporation.

Johannesburg Municipal Council have placed orders for copper rail bonds with the Western Electric Company of America, and for the supply of tramcar gear wheels with Hubert Davies and Company.

The British Westinghouse Electric and Manufacturing Company, Limited, are the successful tenderers for a 3,000-KW. turbo-generator for Stoke-on-Trent Corporation. The amount of the tender is £18,805.

Magnetic Brakes.—The general manager of Sheffield Corporation tramways has sold to Rotherham Corporation five sets of second-hand magnetic brake fittings, taken from the cars recently purchased from the London County Council, at £10 per set.

Glasgow Corporation have recommended the acceptance of the following offers:—Traction lamps, Edison and Swan Electric Company and the General Electric Company; steel pinions, A. Wiseman, Limited; gear cases, Equipment and Engineering Company; special track work, Hadfields, Limited.

Sheffield Electricity Committee recommend the City Council to accept an offer of the Ministry of Munitions with regard to the transference to Sheffield of a 28,000-KW. plant; to give instructions for the contracts to be placed for the necessary machinery, boilers, etc., at a total cost of £560,000; and to approve the expenditure of £448,000 of the sum named during the current financial year.

Southend Highways Committee have recommended the purchase of four electric 2-ton "Orwell" vehicles, with electric tipping bodies and Ironclad Exide batteries from Messrs. Ransomes, Sims and Jefferies, at a cost of £932 each. They have also recommended that application should be made to the Local Government Board for sanction to borrow for a term of five years £4,150 for the purchase of the vehicles, motor generator, and necessary charging plant.

PERSONAL.

Mr. W. G. Snell, tramways manager at Perth, has been granted an increase of £25 per annum in salary.

Mr. G. H. Lake has been appointed chief assistant engineer in the electrical department of Derby Town Council.

Mr. John Barr has been appointed a director of Vickers, Limited, in succession to Mr. A. Miller, who has resigned.

Mr. J. A. Lycett, a member of the Council of the British Electrical Federation, has been appointed a magistrate for Staffordshire.

Mr. J. Crowther, electrical engineer, of Wallasey, has been granted an increase in salary from £550 to £650 by annual increments of £25.

Dundee Town Council has granted a war bonus of 7½ per cent. on the salaries of the burgh engineer, the water engineer, and the tramways manager.

Mr. A. C. J. Charlier, of the Pearlite Steel Company, Limited, Sheffield, has been elected the first president of the National Association of Industrial Chemists.

Mr. W. E. Riley, architect of the London County Council, who would have retired in October next under the age limit, will retain his office until October, 1918.

Mr. R. R. Greene, tramway manager of Wallasey Corporation Tramways, has been granted an increase in salary from £550 to £650 by four annual instalments of £25 each.

Mr. A. Hollinworth, who is at present in the employ of the Huddersfield Corporation, has been offered the post of electricity manager to the Holmfirth Urban District Council.

Mr. E. Jordon, of the South Lancashire Tramways Company, has been presented by the engine-room staff with a wristlet watch on the event of his leaving the company to join H.M. Forces.

Mr. F. H. Rudd has been recommended by the Rochdale Electricity Committee for appointment as electrical engineer to the Corporation at a salary of £400 per annum, with an increment of £50 within twelve months.

Messrs. Kincaid, Waller, Manville and Dawson have removed their offices to 3, Central Buildings, Westminster, S.W.1; St. Stephen's House, their previous address, having been requisitioned by the Government.

Southend-on-Sea Town Council, owing to the depletion of their staff, have found it impossible to allow the electrical engineer, Mr. R. Birkett, to serve two days per week for three or four months with the Coal Control Board.

Mr. John Wardle, commercial manager of the Metropolitan Railway, has been appointed by Lord Rhondda to control cold storage and inland transport of food. Mr. Wardle studied the methods of the great American meat chilling companies during his visits to the United States. He commenced his railway career with the Lancashire and Yorkshire Railway in Manchester, and during ten years gained a large experience in railway and dock work. He then left Britain to take up a position with the Grand Trunk Railway of Canada. Returning to Britain, he became London traffic manager of the same railway, and in 1908 joined the Metropolitan Railway.

Mr. E. A. Robert, president of the Montreal Tramways Company, has been elected a director of the British America Assurance Company and the Western Assurance Company, whose head offices are at Toronto. It is stated that Mr. Robert's appointment is the outcome of a desire of the assurance companies to come into closer touch with large financial and commercial interests in the Province of Quebec. Mr. Robert was appointed a few years ago to the presidency of the Montreal tramways system, and has pursued a policy of extension which has greatly improved the position of the undertaking. The rolling stock has been modernised, and the services greatly improved.

Portsmouth Salaries.—Portsmouth Town Council have, on the recommendation of the Tramways Committee, increased the salary of the general manager, Mr. W. R. Spaven, from £500 to £550 per annum, and to £600 in a year's time; and the salary of the engineer, Mr. V. G. Lironi, from £400 to £450 per annum, and to £500 a year hence. Councillor J. Timpson, chairman of the Tramways Committee, who moved the adoption of the proposals, mentioned that

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they were not made on account of the increased cost of living, but as just recognition for extra work well done. Owing to increased traffic extra work and extra responsibility had devolved both on the manager and engineer.

WITH THE FORCES.

Mr. W. P. Durtnall has received a commission as temporary lieutenant in the R.N.V.R. He will be engaged in special electrical engineering and research work.

Signaller Sergeant F. Hall, formerly in the employment of the Blackpool, St. Annes and Lytham Tramways Company, is in hospital in France suffering from shrapnel wounds.

Company-Sergeant-Major R. Edwards, York and Lancaster Regiment, who was a driver on the Rotherham Corporation tramcars, has been promoted to be Regimental-Sergeant-Major.

Sergeant S. Davey, who before joining the colours was a driver on the Rotherham Corporation Tramways, has been promoted to be Company-Sergeant-Major, York and Lancaster Regiment.

Lieut. E. Ivor David has been appointed captain in the R.F.C. (Equipment Department). Captain David was formerly manager of the British Thomson-Houston Company in South Wales.

Corporal James Blackhall, Cameron Highlanders, who has been awarded the Military Medal for bravery in the field, was, prior to joining the army, in the employment of Glasgow Corporation Tramway Department.

Bristol Tramways Employee's Medal.—Mr. Chas. Challenger, manager of the Bristol Tramways and Carriage Company, has sent to us the following :—

Private C. F. Tuplin, of the A.S.C., M.T., was awarded the Military Medal under the following conditions :—He was in charge of a lorry delivering rations to batteries on the night of July 12, at Ypres. He and two men with him were heavily gassed, and the lorry riddled with shrapnel, after having delivered rations to two batteries. Although in this condition he continued the delivery. Returning, still under heavy shell fire, he stopped at the Water Tower, Ypres, and picked up six men, wounded and gassed, bringing them to the casualty clearing station. On arrival at the Park, Private Tuplin and the other two men had to be taken to the hospital. Private Tuplin in civil life was a clerk for many years at Leek Lane carriage-building works of the Bristol Tramways and Carriage Company, and joined the A.S.C. in the early stages of the war.

Captain James G. Cunliffe, of the Manchester Regiment, died of wounds on August 1. A short time ago he was awarded the Military Cross for bravery. Captain Cunliffe took the degree of M.Sc. (Tech.) at the Manchester School of Technology, and entered the service of the Manchester Corporation Tramways, becoming assistant electrical engineer. He subsequently occupied a similar position at Birmingham. Captain Cunliffe was joint author with his brother, Mr. R. G. Cunliffe, of various papers read before the Tramways and other associations.

ORDER OF THE BRITISH EMPIRE.

The first appointments to the Order of the British Empire were announced on August 25. Among those included in the list were the following :—

KNIGHTS GRAND CROSS.

The Right Hon. Sir Eric Geddes, K.C.B., M.P., formerly Inspector-General of Transportation, Headquarter Staff, France. Now First Lord of the Admiralty.

The Hon. Arthur Stanley, C.V.O., C.B., M.P. Chairman of the British Red Cross Society and St. John of Jerusalem in England.

KNIGHTS COMMANDER.

Herbert Austin, Esq., founder of the Austin Motor Company.

Dugald Clerk, Esq., past president of the Institution of Automobile Engineers.

Alfred Edward Herbert, Esq., deputy director-general, Machine Tool Committee.

Lynden Macassey, Esq., K.C., director of Shipyards Labour.

Cecil Partridge, Esq., manager and secretary, Metropolitan Munitions Committee.

Sir Vincent Litchfield Raven, deputy controller (Navy), late acting chief superintendent, Royal Ordnance Factories, Woolwich.

COMMANDERS.

A. Bellamy, Esq., president, National Union of Railwaymen.

William Duddell, Esq., F.R.S., member of the Panel of Board of Invention and Research, Admiralty.

Harry Tempest Vane, Esq., managing director, D. Napier and Sons.

Arthur Watson, Esq., member of the Railway Executive Committee.

OFFICERS.

George Keith Buller Elphinstone, Esq., managing director of Elliott Brothers, electrical instrument makers, Lewisham.

Michael Birt Field, Esq., director, Messrs. Kelvin, Bottomley and Baird, Limited.

Walter Hudson, Esq., assistant secretary, National Union of Railwaymen.

TRAMWAY AND LIGHT RAILWAY NOTES.

ASHTON.

NEW LEASE OF THE HURST TRAMWAYS.

At a meeting of the Tramways Committee of the Hurst Council with regard to the proposed new lease of the Hurst tramways, the terms proposed for the new lease of the tramways were stated. Hurst Council is to pay the cost of the renewals, and the Ashton Corporation to carry out the work and to pay the Hurst Council a sum of £60 towards the cost of such renewals. Hurst Council will pay either 5 per cent., or the average rate of interest on the capital expenditure of the undertaking, instead of 3½ per cent. under the present lease.

BELFAST.

OVERHEAD EQUIPMENT TRANSFERRED TO TRAMWAY DEPARTMENT.

Alderman Tyrrell, chairman of the Belfast Tramways Committee, drew attention at the Council meeting on August 1 to the recommendation that the control and management of the overhead equipment of the tramways be transferred from the electrical engineer to the general manager of the tramways. The committee were unanimous in making the recommendation, believing that the re-arrangement would avoid the overlapping, confusion, and waste which usually results from dual control. The committee were convinced that the change, which was due in no way to any inefficient management on the part of the electrical engineer, would be a good thing for both departments. The proposal was approved by the Council.

BIRMINGHAM.

EFFORTS TO SUPPLY ENERGY REQUIRED BY THE TRAMWAYS.

Alderman Jephcott, chairman of the Electric Supply Committee, has informed Birmingham Council that while the Government would not sanction the erection of the proposed permanent power-station, the committee were doing their best to prevent any interruption of the tramway services by having the machinery put into the best possible condition, and by not taking more consumers on than they could see their way to supply. The whole of the energy required by the tramways is taken from the Corporation's electricity station, and last winter numerous stoppages and delays were caused by the inability of the station to meet the demands.

BURNLEY.

CONFERENCE BETWEEN EMPLOYEES AND COMMITTEE.

Recently the Tramways Committee of Burnley Corporation met a deputation from the Tramway and Vehicle Workers' Association with the object of clearing up some points connected with the recent strike. The chief point raised by the representatives of the employees related to the training of learners as drivers and conductors and the part time employment of men of military age who are engaged in other occupations. The employees feared that men eligible for military service might be trained as tramway workers, thereby relieving others of military age already in the tramway service. It was proved, however, that the number of learners was barely sufficient to relieve those men of military age who are likely to be required at an early date. It was explained that the committee were acting in accordance with a resolution of the Town Council of June, 1915, instructing the committees of the Corporation when filling vacancies or engaging employees during the period of the war not to engage anyone eligible for naval or military service. It was also pointed out that the committee were employing discharged soldiers, when suitable, for tramway work. This was in accordance with a resolution of the Council passed in October, 1915, to the effect "that it be an instruction to the committees of the Corporation that employees who have received their discharge from the army or navy disabled be, wherever possible, employed in the department of the Corporation in which they were engaged previous to joining the army or navy." It is stated that the explanation of the committee was satisfactory to the deputation.

EDINBURGH.

INCREASED EXPENSES ENTAIL HIGHER FARES—TEMPORARY EXEMPTIONS GRANTED EMPLOYEES.

The fares were raised on August 19 last, the 1½d. fare becoming 2d. and the 2½d. fare 3d. Further alterations and increases will probably follow at an early date. The company explain that they have made strenuous efforts in the face of great difficulties to maintain the services and to avoid any increase in fares, but as the Corporation decline to reduce the rent they had no alternative but to increase fares. They point out that the impression that the company had in the past earned large profits was incorrect. The dividends paid since the inception of the company in 1894—i.e., over a period of 23½ years to date—averaged 7·63 per cent., and the total sum paid in dividends represented the sum of £165,875, or only £7,058 per annum, whereas the Corporation had received for rent and owners' rates and taxes and insurance to June 30 last the sum of £1,818,281. The increase is rendered necessary by the enhanced cost of material, increases in wages, the depletion of the car services entailed by so many drivers having been taken by the military authorities, and heavy charges on the company for rent, rates, and taxes. The recent wage increase to employees represented a sum of £12,000 per annum. It is estimated that the

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additional expenditure for the year ending June 30, 1918, as compared with the year 1913, will be about £75,000. An appeal by the Edinburgh and District Tramway Company for the further exemption of 205 of their employees was heard by a local Tribunal on August 7. Mr. Cox, the general manager, stated that every man taken meant a car off the streets. After hearing a number of cases, the Tribunal released one man, a fitter, and granted the others exemption till December 1.

EXETER.

FORTHCOMING ARBITRATION.

An Industrial Commissioner expects shortly to visit Exeter to arbitrate between the Corporation Tramways Committee and the employees in respect of the application for over 20 per cent. advance in wages. It is stated that the employees have the support of the Trades and Labour Council, representing about 4,000 workers in various trade unions in the city, and the Exeter branch of the National Union of Railwaymen have passed the following resolution:—"That this meeting of the N.U.R., representing 1,000 citizens, protests against the long hours worked by, and low wages paid to, Exeter tramway employees, and calls upon the City Council to give substantial increases of wages upon a basis compatible with the present cost of living."

HASTINGS.

TROLLEY STANDARD TORN FROM CAR.

An accident of a kind which is fortunately very rare recently occurred on a car of the Hastings Tramways Company. Proceeding from St. Leonards to Bexhill on August 8, the trolley wheel caught in the overhead work, and the trolley standard was torn from the roof of the car and fell into the roadway. Several passengers were injured, one seriously.

HUDDERSFIELD.

PRIVILEGED PASSENGERS.

In spite of a recommendation to the contrary effect by the Tramways Committee, Huddersfield Town Council have decided to allow the clinical and nursing staffs of its war hospitals to travel free on the cars. Members of the Volunteer Corps can ride at half rates when in uniform going to and from drill. It was stated that the cars were carrying 11,000 wounded soldiers every week. Aberdeen Tramways Committee have agreed to abolish free tokens to nurses and soldiers on military duty, but to fix a maximum fare of ½d. all over for soldiers and sailors in uniform.

MANCHESTER.

IMPORTANT SCHEME TO RELIEVE CONGESTION.

The Special Committee of Manchester Corporation, who for a long time have been discussing plans for the relief of traffic congestion, have finished their work. Mr. J. M. McElroy, the tramway general manager, who has given much study to the question, was able to lay important considerations before the committee. It is reported that the committee are of opinion that new routes and additional termini are required to meet the growing passenger and merchandise traffic in the centre of the city. The members of the committee suggest the widening of certain streets and the creation of new thoroughfares so as to relieve the tramway traffic on the southern and south-western sides of the city, as well as the east and north-east sides. The idea of converting the site of the old Infirmary in Piccadilly into a network of tramlines has been abandoned. The committee, however, propose that a portion of the site should be used as a tramway terminus. The whole scheme will, it is estimated, involve an expenditure of from £1,000,000 to £1,500,000.

NEWCASTLE-ON-TYNE.

AIR RAID WARNING FROM TRAMCARS—VOLUNTEER MOTORMEN.

The Newcastle City Council recently approved the plans for the use of the tramway cars as the most effective means of giving warning of air raids. In case of a raid at night, the current will be interrupted and restored after an interval of a minute, so that the driver would know that it was not an accidental failure of the current but intentional, and it will then be finally cut off. In daylight, on receiving the signal—i.e., the cutting off of the current—the motorman will hoist on the front of his car a red flag. The Lord Mayor, making a statement at the Council meeting, said that the scheme was a matter of precaution. They did not want anybody to be "panicky," but they were taking time by the forelock to prepare for any development that the enemy contemplated. The Tramways Committee have released over forty men for the army during this month, their places in the majority of cases having been filled by men of lower categories unfit for military service. About one hundred men, many of whom are said to be well-known professional business men in the city, are now engaged from 5 till 7 o'clock every morning in conveying workers to munition factories, and they also act as auxiliary drivers on Saturday afternoons.

PETERBOROUGH.

INCREASE IN PRICE OF ENERGY.

The Town Council has decided upon another increase of 10 per cent. in the price of electrical energy as from September 30, making a total addition on the pre-war rate of 20 per cent. Peterborough Electric Traction Company is to be notified that the rates paid by them are to be revised in three months' time.

SHEFFIELD.

WELFARE WORK—RESULTS OF HALFPENNY FARE ABOLITION.

A writer in the *Sheffield Daily Telegraph* remarks that Sheffield may be justly proud of its staff of women tramway employees. Starting with an experimental dozen, the numbers have now reached six hundred out of a total of just over a thousand. About three hundred wear the star which denotes one year's service. The Corporation pay these women on the principle of equal pay for equal work, and they have also taken special measures to secure the comfort of the employees. Sheffield Tramways Committee were among the first in this country to provide a club and canteen for their men, and an adjacent building has now been fitted up for the women. A staff of about eleven workers manage the clubs, which cost the committee approximately £1,000 a year, or about £1 per employee per annum. As the general manager, Mr. A. R. Fearnley, puts it, "The club isn't a luxury, it's a necessity. We cannot turn one thousand employees loose in the centre of the city for meals and rest." The girls' club has an average attendance of 220 a day. Above the canteen is a large rest-room with a piano. The writer in the *Telegraph* pays a tribute to Mr. Fearnley, "whose broad-minded interest and careful attention to details in the welfare of the tramway employees is," he says, "no doubt largely responsible for the happy conditions which prevail." Sir William Clegg, chairman of the Tramways Committee, has stated that the result of the abolition of the halfpenny fare has so far proved satisfactory. For the four weeks ended July 22, 1916, the receipts were £43,238, as compared with £48,738 for the same period of this year, an increase of £5,500, or over £1,300 per week.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

APPLICATIONS FOR LETTERS PATENT.

Wheels for motor vehicles (10,619)—W. Comery and Raleigh Cycle Company.

Motor vehicles (10,781)—A. G. Grice and G. and V. R., Limited.

Chassis and driving mechanism for motor vehicles (10,585)—E. F. Jenkins.

Tramway systems and transporting goods thereon (10,859)—P. Kenyon.

Street railways (10,640)—A. A. Kinney.

Automatic control for vehicles (10,597, 10,599)—A. J. Macy.

Differential devices for road wheels of motor vehicles (10,563)—S. J. Murphy.

Turntables for tramways, etc. (10,763)—Soc. Faure Frères.

Rail fastening (10,762)—J. R. Steele and the Steele Rail Anchor Company.

Adjustable tram-raising apparatus (11,002)—T. J. Bollard and D. J. Jones.

Fluid pressure brakes (10,963)—British Thomson-Houston Company (*General Electric Company*).

Reinforced concrete railway sleepers (11,284)—C. C. Coade.

Gear trains (10,961)—L. M. Douglas and Sir C. A. Parsons.

Lifting jacks (10,937)—F. R. Goddard.

Clutches for motor vehicles, etc. (10,898)—W. Harphan.

Railway sleepers (11,213)—E. A. W. Phillips.

Brake mechanism for vehicles (11,304)—Birmingham and Midland Counties Transport Company.

Self-acting mechanical brake for railway and tramway vehicles (11,586)—T. Grey and T. U. Williams.

Brake mechanism for vehicles (11,304)—G. E. D. Ralls.

Train control (11,439)—P. Torphy.

Steering mechanism of motor-propelled vehicles (11,815)—Alldays and Onions Pneumatic Engineering Company, N. L. Hilton, and C. E Simms.

Motor vehicles (11,004)—J. V. Collyer.

Trolley heads of electric tramways (11,830)—W. H. Cottee and R. H. Hollingsbee.

Solid rubber tire (11,854)—Dunlop Rubber Company and J. V. Worthington.

Road vehicle suspension arrangements (11,704)—W. Greenwood and W. H. Marsden.

Chair for holding rails on railways (11,726)—D. John.

Vehicle direction indicator (11,741)—J. Peyré.

Speed changing and reversing gear (11,712)—G. Pollard.

Wheels for motor vehicles (12,008)—F. E. Baker.

Speed indicating devices for motor vehicles (12,225)—A. A. Benson and Benson, Flick and Solberg.

Railway sleepers (12,062)—T. Brown.

Railway chairs (12,063)—T. Brown.

Motor vehicles (12,096)—Coventry Premier, Limited, and G. Funck.

Trailer gas fuel container for motor vehicles (11,961)—D. S. Cox.

Steering mechanism for motor vehicles (11,913)—W. Ellis.

Electrical point detectors for railways (12,104)—A. E. Hudd and G. H. Wion.

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For Places Abroad—Thirty Shillings per annum.

Motor vehicles (12,064)—O. D. North and Straker-Squire, Limited.
Apparatus for storing coal gas for motor vehicles (12,151)—G. P. Ottino.
Protectors for trollies of electric tramway cars, etc. (11,899)—A. Stevenson.
Automatic brake mechanism (12,006)—E. L. Wetzel.

Specifications Published.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.

Combined driving and steering axles for motor road vehicles (9,067—*107,421*)—P. J. F. Batenburg.
Double-deck tramcars and motor omnibuses (9,339—*107,428*)—E. Hatton.
Automatic train control systems (12,352—*105,324*)—W. V. Turner.
Anchorage for tramway rails (15,829—*107,517*)—J. Gordon.
Means for stabilising track of railway permanent way by means of piles (10,010—*107,661*)—F. Fabre.
Solid rubber band tires (13,807—*107,701*)—W. and A. Bates and J. Healey.
Quick-acting combined automatic and straight air brakes (9,704—*107,803*)—W. E. Pomeroy.
Ticket punches (10,245—*107,828*)—E. G. Judd.
Clutch and brake mechanism (15,524—*103,473*)—M. Axilrod.
Motor vehicles (15,604—*107,902*)—H. J. Dew.
Railway vehicles (5,247—*107,989*)—T. F. Craddock (*Burn and Company*).
Life-guards for motor road vehicles (9,940—*108,006*)—S. C. Caddy.
Means for stabilising the track of railway permanent way (10,009—*108,012*)—F. Fabre.
Means for consolidating rail joints (10,012—*108,013*)—F. Fabre.
Transmission gear for motor vehicles (13,804—*108,070*)—C. E. Oliver.
Four-wheel driving devices for motor-propelled vehicles (11,310—*108,216*)—J. L. Ware.
Variable speed transmission gear (11,998—*108,221*)—F. Molyneaux.
Live back axles and gearing for motor vehicles (15,300—*108,251*)—R. R. Mellor and T. M. G. Morton.

1917.

Fastening rails to sleepers (3,705—*107,554*)—E. Hudson and W. S. Hudson.
Rail joints (116—*107,729*)—A. E. Alexander (*Interlocking Rail Joint Corporation*).
Suspension devices for motor vehicles (8,635—*107,750*)—R. Esnault-Pelterie.
Anti-skid and traction devices for vehicle wheels (6,888—*106,496*)—M. H. Cleaver.
Lifting jacks for motor road vehicles (2,828—*108,275*)—F. L. Rapson.
Regenerative braking systems for electrically driven vehicles (2,869—*108,276*)—W. V. Turner and T. H. Thomas.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1916. WEEKS ENDED.					1917. WEEKS ENDED.					AGGREGATE.		
	Aug. 5.	Aug. 12.	Aug. 19.	Aug. 26.		Aug. 4.	Aug. 11.	Aug. 18.	Aug. 25.		Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	49.487	48.752	48.713	48.713	...	52.565	51.017	50.140	49.469	...	34	1.738.652	+ 14.596
Auckland	21.507	(28 days)	...	...	...	21.799	(28 days)	...	...	...	4	21.799	- 292
Calcutta ... ... Rs.	72.167	69.736	70.187	66.100	...	69.200	68.300	70.470	69.485	...	34	2.305.965	+ 19.447
Madras ... ... Rs.	...	(14 days)	32.269	...	...	...	(14 days)	34.911	...	...	32	515.945	+ 46.565
Pernambuco	3.125	3.140	3.193	2.996	...	4.003	3.878	3.938	3.805	...	33	126.561	+ 24.999

Companies Issuing Monthly Statements.

	1916. March.	April.	May.	June.	July.	August.	1917. March.	April.	May.	June.	July.	August.	Wks.	AGGREGATE. 1916-17.	+ or -
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	3.881	3.727	3.854	2,794	...	...	3.422	4.611	2.991	2.849	...	...	12	10.451	- 76
Brazilian Traction Mlrs	6913000	6882000	7304000	7178000	...	...	7549000	7453000	7864000	7642000	...	...	26	44.646.000	+3.467.000
Brisbane	34.275	32.575	33.150	31.390	32.880	...	33.340	31.620	33.340	32.475	32.720	...	30	226.315	- 915
British Columbia ... $	446.401	421.265	414.215	400.814	411.847	...	456.626	447.429	438.919	373.029	438.378	...	4	438.378	+ 26.531
Buenos Ayres Lacroze	42.219	40.220	40.220	36.213	38.439	36.431	41.337	39.111	40.595	38.020	38.063	39,111	8	77.174	- 2.304
Burma	22.958	22,191	23.585	24.027	26.340	...	27.132	23.660	24.906	25.463	26.288	...	52	309.167	+ 29.082
Cape Town	14.994	...	...	...	...	...	17.688	16.705	15.867	...	16.067	...	—	—	—
Carthagena & Herrerias	2.991	2.513	2.927	3.512	2.371	2,081	2.955	4.366	4.321	5.325	5.763	4,164	34	34.099	+ 13.278
Cordoba	13.598	...	14.869	...	...	...	13.098	...	13.735	...	...	...	9	27.395	- 1.546
East India	2.196	2.116	2.161	2.283	2.220	...	1.647	1.445	1.455	1.186	1.183	...	52	21.509	- 3.861
Kalgoorlie	2.479	2.553	2.921	...	...	...	2.772	2.705	2.692	...	...	...	21	12.793	+ 356
La Plata	4.611	4.354	4.342	3.735	3.910	...	4.527	4.229	4.126	3.852	3.875	...	30	29.019	- 816
Lima	34.169	33.542	33.966	...	...	...	37.569	37.807	35.321	...	...	...	21	181.809	+ 13.098
Manaos ... ... Rs.	...	155.030	152.854	144.913	152.380	...	161.156	160.545	158.613	...	...	...	—	—	—
Manila ... ... $	...	..	53.900	...	...	...	...	...	61.500	...	...	...	—	—	—
Mexico ... ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	31.956	28.997	28.349	25.300	25.220	...	31.979	29.230	28.716	27.458	28.597	...	39	271.393	+ 5.105
Peruvian ... ... $	...	...	826.900	929.500	835.430	...	...	...	902.780	965.420	975.000	...	4	975.000	+ 139.570
Port Elizabeth	...	...	...	...	...	...	4.428	3.904	3.494	...	3.544	...	—	—	—
Rangoon	5.501	4.849	4.589	4.205	4.357	...	6.226	5.036	4.737	4.383	4.783	...	30	34.403	- 1.465
Toronto ... ... $	910.969	883.209	903.924	884.491	867.789	...	...	970.367	992.460	984.529	954.192	...	30	6.827.776	- 624.788
Winnipeg ... $	296.500	282.498	276.980	254.686	242.688	...	293.094	265.594	259.794	254.226	242.797	...	30	1.916.167	- 27.995

(Continued on page 180)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1916. WEEKS ENDED.				1917. WEEKS ENDED.				AGGREGATE.		
	Aug. 5.	Aug. 12.	Aug. 19.	Aug. 26.	Aug. 4.	Aug. 11.	Aug. 18.	Aug. 25.	Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	420	525	411	445	445	584	476	456	20	9.006	+ 883
Aberdeen Corporation	2.074	2.232	2.092	1.987	2.237	2.205	2.323	2.251	12	26.984	+ 3.403
Accrington Corporation	*	...	...	...	...	...	...	...	—	—	—
Ayr Corporation	683	773	681	1.003	688	724	814	619	15	9.242	+ 1.032
Bath Electric	*	...	...	...	...	...	...	...	—	—	—
Belfast City	6.036	6.160	5.374	5.626	6.361	6.633	6.410	6.392	21	129.932	+ 11.394
Birkenhead Corporation	1.663	1.700	1.642	1.613	1.935	2.155	1.961	1.824	21½	38.423	+ 5.474
Birmingham Corporation	17.029	17.390	16.643	16,900	18.032	18.249	18.103	18,743	21	375.500	+ 26.030
Birmingham Corp. Motor Omnibuses	1.187	1.405	1.089	1,068	961	1.451	1.150	1,177	21	20.378	− 896
Blackburn Corporation	1.347	1.391	1.358	1.335	1.738	1.641	1.771	1.568	17⅝	32.863	+ 4.783
Blackpool and Fleetwood	2.002	2.652	2.678	2.373	2.038	2.672	2.603	2.188	33	28.863	− 90
Blackpool Corporation	*	...	...	...	...	...	...	...	—	—	—
Bolton Corporation	...	...	...	...	...	...	...	...	...	—	—
Bournemouth Corporation	3.303	3.350	3.288	2.969	3.766	3.757	3.862	3.149	21½	56.049	+ 2.674
Bradford Corporation	7.355	7.294	7.923	8.017	7.653	8.608	8.924	8.084	21	163.247	+ 15.002
Brighton Corporation	1.817	2.093	1.942	...	1.866	2.561	2.216	...	20½	30.826	− 4.084
Bristol	5.603	6.308	5.171	5.358	5.955	7.549	5.915	6.330	33	180.895	+ 15.724
Burnley Corporation	1.797	1.739	1.769	1.702	1.930	1.934	1.863	1.835	—	—	—
Burton-on-Trent Corporation	301	324	322	319	342	396	334	331	21	71.655	+ 539
Bury Corporation	1.561	1.561	1.558	1.564	1.720	1.836	2.041	1.806	21½	36.137	+ 4.368
Cardiff Corporation	*	...	...	...	...	...	...	...	—	—	—
Chatham and District	1.528	1.669	1.469	1.498	1.359	1.841	1.611	1.507	23	43.790	+ 2.680
Chesterfield Corporation	*	...	...	...	...	...	...	...	—	—	—
Colne Corporation	*	...	...	...	...	...	...	...	—	—	—
Cork Electric	643	651	557	580	674	679	621	595	34	18.314	+ 1.136
Croydon Corporation	*	...	...	...	...	...	...	...	—	—	—
Derby Corporation	1.281	1.347	1.282	1.287	1.260	1.561	1.319	1.284	21	25.382	+ 696
Dover Corporation	*	...	...	...	...	...	...	...	—	—	—
Dublin and Lucan	...	...	...	...	...	...	...	...	—	—	—
Dublin United	7.516	7.820	7.017	7.074	7.572	8.458	7.242	7.099	34	224.955	+ 23.068
Dundee City	1.523	1.573	1.492	1.492	1.592	1.489	1.498	1.573	14½	22.056	+ 1.853
East Ham Corporation	1.476	1.450	1.373	1.416	1.405	1.599	1.482	1.508	21	30.313	− 2.003
Exeter Corporation	499	512	485	475	469	538	456	456	21	8.623	+ 17
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	23.931	24.110	23.638	20.766	26.029	26.142	25.902	25.907	12⅝	322.707	+ 36.741
Glossop (Urban Elec. Supply Co.)	152	154	154	143	...	...	176	176	34	5 009	+ 360
Halifax Corporation	2.551	2.647	2.875	2.753	2.580	2.897	3.418	3,165	20⅝	52.925	+ 4.174
Halifax Corp. Motor Omnibuses	59	59	72	63	53	54	69	68	20⅜	972	− 73
Hastings and District	1.623	2.082	1.930	1.908	1.600	2.381	2.089	2.019	34	40.973	+ 6.193
Huddersfield Corporation	3.247	3.357	3.387	3.047	3.269	3.849	3.784	3.385	21	69.816	+ 6.008
Hull Corporation	3.202	3.444	3.286	3.157	3.517	3.828	3.530	3.478	21	71.161	+ 4.301
Ilford U.D. Council	787	798	...	...	791	1.034	...	...	19	14,773	+ 1,304
Ilkeston Corporation	*	...	...	...	...	...	...	...	—	—	—
Ipswich Corporation	621	675	614	597	798	1.127	845	865	21	14.687	+ 2.817
Isle of Thanet	791	1.023	1.002	987	347	713	574	601	47	14.477	− 2.178
Kilmarnock Corporation	192	180	188	188	184	188	194	195	14½	2 838	+ 198
Lanarkshire	2.481	2.773	2.593	2.631	2.865	3.042	2.965	2.963	34	91.750	+ 14.151
Lancashire United	2.061	2.328	2.052	2.036	2.624	3.929	2.902	2.805	34	77.166	+ 16.678
Leeds City	10.625	11.232	10.491	10.612	10.719	12.579	11.312	11.549	21	233.385	+ 23.404
Leicester Corporation	*	...	...	...	...	...	...	...	—	—	—
Leith Corporation	992	999	939	900	1.099	1.106	1.084	1.033	14½	16.056	+ 2.796
Leyton U.D. Council	1.999	2,121	1.869	1.904	1.917	2.270	1.981	2.026	21	40.629	+ 4.359
Liverpool Corporation	15,726	16.286	15.204	15,107	16.564	18.295	16.657	16,289	33½	519.321	+ 44,227
Llandudno and Colwyn Bay	643	966	878	884	628	982	836	836	38½	12.521	− 789
London County Council	52.598	52.079	49.775	49.848	55.757	61.545	57.592	58.527	20½	1,146.260	+143.669
London General Omnibus	*	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	*	...	...	...	...	...	...	...	—	—	—
Maidstone Corporation	256	261	249	242	239	346	280	277	21	5.182*	+ 488
Manchester Corporation	19.635	20.065	19.235	19.575	20.082	22.410	20.700	21.463	21	431.335	+ 29.240
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	232	225	224	214	236	262	235	230	21	4.954	+ 316
Newcastle-on-Tyne Corporation	7.322	7.055	7.012	7.030	7.970	8,388	7.860	8.042	21	162.746	+ 23.046
Newport (Mon.) Corporation	*	...	...	...	...	...	...	...	—	—	—
New St. Helens and District	1.260	1.661	1.369	1.195	1.569	2.465	1.750	1.656	8	13.508	− 3.915
Northampton Corporation	785	928	758	762	857	1.167	852	884	21	17.296	+ 2.190
Nottingham Corporation	4.187	4.444	4.158	4.213	4.420	5.574	4.551	4.619	21	90.829	+ 8.564
Oldham Corporation	2.726	2.614	2.529	2.788	2.972	3.055	2.906	3.286	22	63.190	+ 6.423
Portsmouth Corporation	3.644	3.807	3.422	3.592	3.041	4.359	3.807	3.834	—	—	—
Preston Corporation	1.120	1.120	1.258	1.177	1.190	1.246	1.356	1.257	20½	24.597	+ 1.676
Provincial	3.092	3.309	2.989	3.012	2.679	3.870	2.173	3.211	47	107.758	+ 1.165
Reading Corporation	978	1.000	945	991	1.058	1.338	1.192	1.182	20⅝	21.524	+ 3.677
Rhondda Tramways	837	1.519	1.358	1.456	832	2.104	1.612	1.532	34	49.823	+ 7.168
Rochdale Corporation	1.927	...	...	...	2.373	...	...	...	18	38.283	+ 4.656
Rotherham Corporation	1.748	1.705	1.764	1.740	1.946	1.931	1.923	1.864	21½	38.439	+ 5.577
Salford Corporation	6.089	5.818	5.603	5.660	8.748	6.814	6.692	6.584	21⅜	141.846	+ 21.988
Sheffield Corporation	10.782	11.177	10.825	11.150	11.717	12.902	12.290	12.468	22	260.804	+ 28.766
Southampton Corporation	1.935	1.986	1.939	1.969	1.975	2.498	2.277	2.294	20⅛	41 040	+ 6.161
Southend-on-Sea Corporation	1.430	...	...	...	1.152	...	...	...	18	16,939	+ 1.157
South Metropolitan Tramways	*	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	1.012	1.019	932	688	960	1.231	1.032	...	20	19.206	+ 2.318
Sunderland Corporation	1.939	2.003	1.789	1.729	1.893	2.346	1.924	1.915	21	38.522	+ 2.146
Sunderland District	831	834	751	716	786	1.205	900	850	43	30.372	+ 4.380
Swindon Corporation	216	236	235	242	...	337	315	304	20⅛	5.651	+ 1.416
Torquay Tramways	1,413	1.050	1.018	1.132	1.536	1.195	1.105	1.065	34	20.923	+ 1.459
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	807	867	788	688	918	1.267	937	1.011	8	7.718	+ 1.855
Wallasey Corporation	1.760	2.005	1.768	1.719	1.926	2.496	2.003	1.981	21½	35.058	+ 4.062
Walsall Corporation	871	1.050	885	928	968	1.436	965	1,055	21	20 350	+ 2.302
Walthamstow U.D. Council	1.462	1.584	...	...	1.216	1.686	...	...	19	24,417	+ 2.672
Warrington Corporation	*	...	...	...	...	...	...	...	—	—	—
West Ham Corporation	3.571	3.567	3.329	3.375	3.701	4.178	3.779	3.835	20⅝	77.584	+ 8.461
Wigan Corporation	1.702	1.996	1.666	1.677	1.961	2.425	2.005	1.997	20	40.765	+ 5.342
Wolverhampton Corporation	*	...	...	...	...	...	...	...	—	—	—
Yorkshire (West Riding)	2.090	2.192	1.903	1.983	2.348	3.186	2.373	2.302	34	70.974	+ 11.682

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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MANCHESTER confirms SHEFFIELD

The Manchester Corporation also obtains remarkably low Maintenance Costs by employing DAIMLER COMMERCIAL CHASSIS only

FOLLOWING on the published statement of the Sheffield Corporation's Motor Omnibus Running Costs, the following records from Manchester again emphasise the fact that for low Maintenance Costs the Daimler is supreme.

PROSPECTIVE users of Commercial Vehicles will do well to carefully note these records, for these Corporations are not unduly influenced by the question of Prime Cost, but base their calculations on the broad lines of efficiency and profitable investment.

Per Bus Mile.

Year ending March 31st.	Mileage Run.	Average Cost.	Average Revenue.	Repairs and Maintenance.
1915	160,775	7·36d.	9·24d.	
1916	82,711	7·17d.	11·84d.	1·68d.
1917	180,956	8·04d.	9·67d.	1·20d.

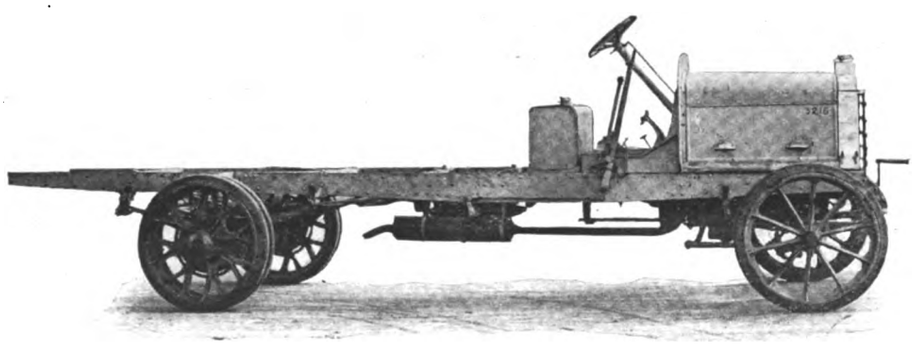
IN the above figures for Repairs and Maintenance the actual cost of *Chassis* Maintenance apart from Tyres, Bodies, Buildings, and Machinery is extraordinary, being at the low figure for 1917 of **·727d.**, a DECREASE on the previous year of ·56d. per bus mile.

The Daimler Way is the sure and certain way to Profits.

Daimler

The Daimler Sleeve-valve Engine is the only Engine which improves with age.

THE DAIMLER COMPANY, Ltd., COVENTRY.



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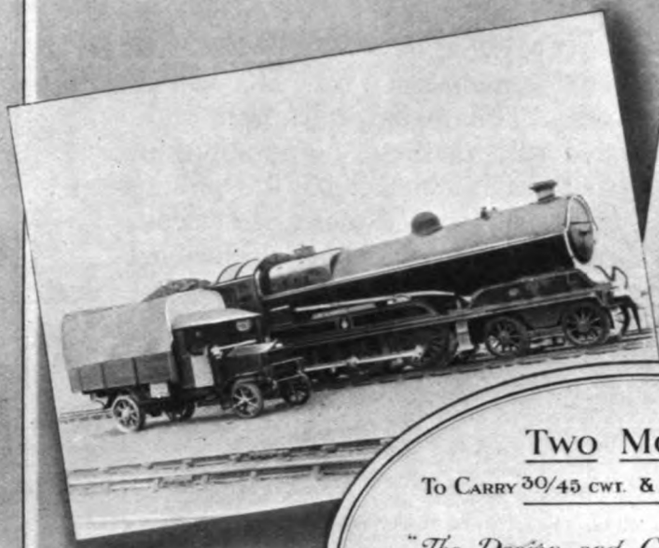
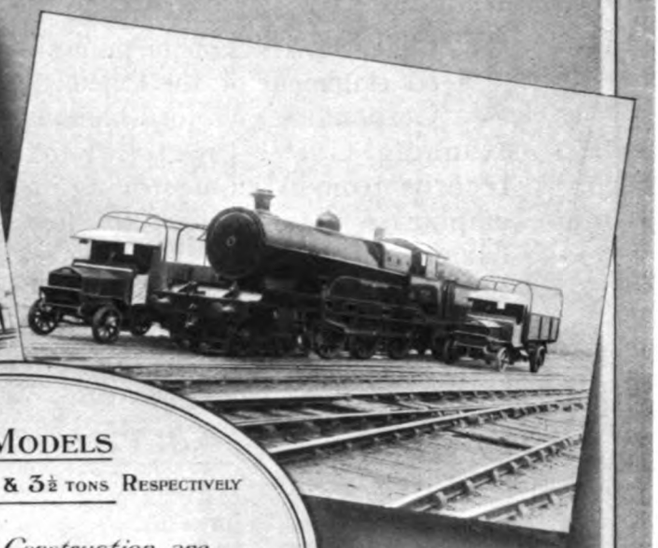
NAPIER

MOTOR VEHICLES.





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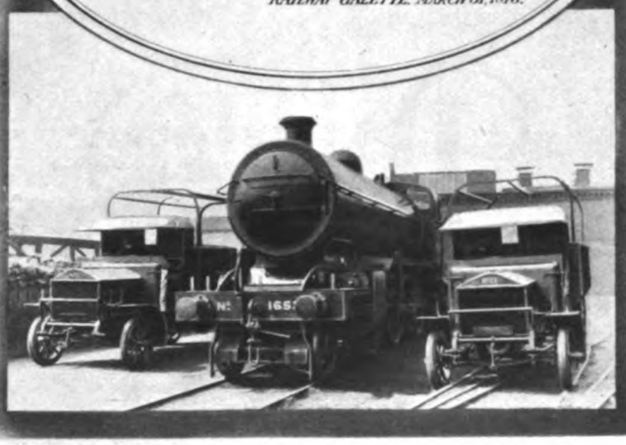

IN WAR

USED BY THE BRITISH AND ALLIED GOVERNMENTS.

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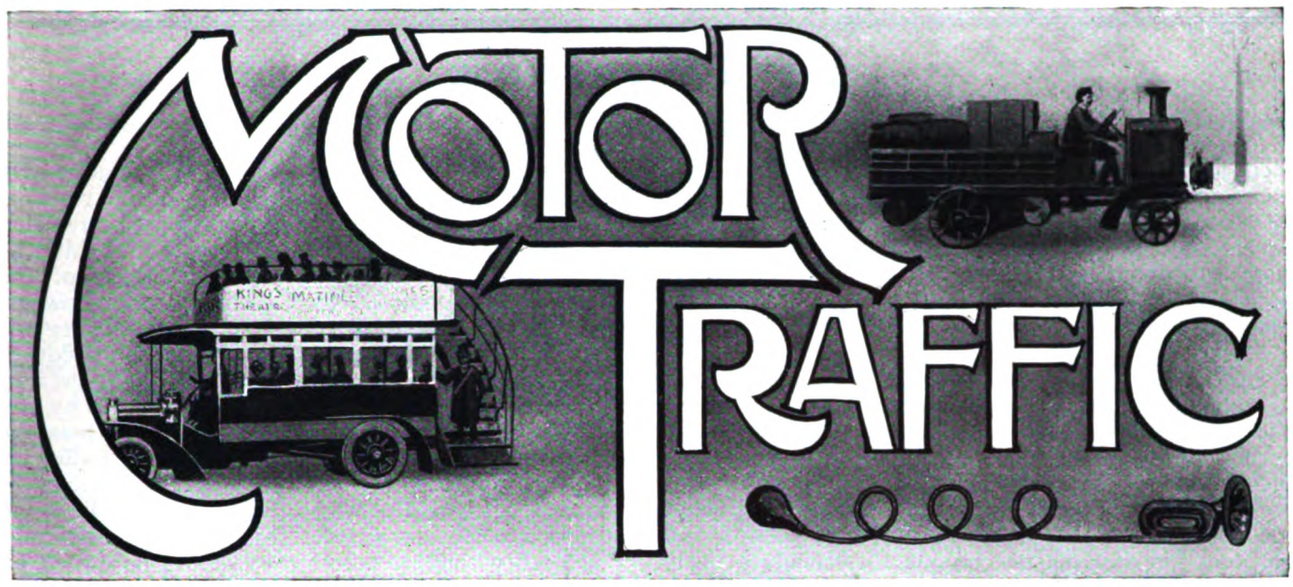

The accounts of various municipal motor omnibus undertakings published this summer have naturally shown an all-round increase in working costs. The most noticeable feature of all is, of course, the rise in the price of fuel, which has been out of all proportion to the improved economy effected by the employment of the best carburetting devices. Matters will no doubt improve after the war, particularly because it is more than probable that the supplies of benzol then freed will be large. At present there is no inducement to use heavier fuels of the paraffin or white oil order, and at no time can such fuels be regarded as offering a satisfactory way of escape from the high prices of petrol, because they are imported and distributed by the same companies, and the supply and price can thus be regulated so as to maintain the price of the lighter fuels. They do, however, represent a factor in the total fuel supply of the world, and therefore in the general relationship of supply and demand. We hear now that the Government proposes to develop the oil resources of the British Isles, and this may have a restraining effect on the price of fuel. One of the latest contributions to the fuel question is a book on "Industrial Alcohol," by Mr. Robert N. Tweedy. Mr. Tweedy hopes to see alcohol fuel produced in very large quantities from potato crops to be grown under improved agricultural conditions in Ireland. If this could be made an economic possibility, it would, of course, be ideal, inasmuch as when this alcohol supply had been added to our benzol we should be completely independent of imported fuels, even if nothing much were to come of the Government's proposals for getting oil. The great trouble is, however, the question of the cost of the raw material, as represented by the potato crop. To make the whole proposition a commercial one, two conditions must be fulfilled. One is that the raw material must be obtainable at such a price that the fuel alcohol can subsequently be retailed at not more than about 70 per cent. the current price of petrol. At any higher figure it would not be competitive so long as it has to be burned rather inefficiently in a petrol engine. The other point is that unless the business were supported by a State bounty, it would have to show itself a better scheme than the import of industrial alcohol from tropical countries. In some of our colonies alcohol crops could be grown at a negligible cost. The problem therefore is whether the cost of bringing the denatured fuel to this country in bulk from the colonies in question would not be very much lower than the additional cost of using home-grown crops for the distillation of alcohol. We freely admit the desirability of the latter course on national grounds, but Mr. Tweedy has not convinced us that it would be economically sound.

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While discussing any questions connected with fuel we ought perhaps to touch upon the subject of the taxation of public service motors, either on a basis of the mileage covered or through the medium of the fuel employed. Motor omnibus services ought not to escape taxation altogether, because these vehicles undoubtedly affect the life of the roads they use. Under the original scheme of taxation, however—setting aside the hackney carriage licences as comparatively trifling—the basic idea was to tax the motor omnibus for the benefit of the roads of the country as a whole, and not specifically for the benefit of those roads upon which it runs. Probably this scheme was, taken all round, the best that could be devised, though it is difficult to see why a municipal motor omnibus service, running within a strictly limited area, should make any payments at all towards the improvement of roads outside that area. It could only be assumed that the Road Board, in distributing the proceeds of the tax, would take the existence of such omnibus services into account, and give the most favourable possible consideration to applications for grants coming from the districts where those services might operate. This possibility had not in it enough certainty to please the local surveyors. Hence, we have now a second and totally different system of taxation in addition to the first. The new idea is to levy a charge on the omnibus service for every mile run, and to apply the proceeds to the maintenance of the roads used by the service. Assuming that the charges made are reasonable, and are not, as has been suggested, made subject to perpetual revision and increase, designed to wipe out almost all the profits of the omnibus concern, there is nothing inherently unfair in this system. It is nevertheless altogether unfair to adopt both methods of taxation together. If the omnibus pays directly for the use of certain roads, it should not pay indirectly and in addition towards the maintenance or improvement of roads which it never uses. If, on the other hand, it makes its fair contribution to the national fund, it ought to be clearly understood that its obligations in respect of road maintenance and improvement are fully met thereby, and that no local dues are to be extorted. If we consider the case of, say, Eastbourne, where there are no tramways, and where, consequently,

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there can be no argument to the effect that the tramways are taxed more severely than the omnibuses, we see at once the absurdity of penalising the ratepayers of that town by making them pay for roads in other districts merely because they happen to prefer to use motor vehicles in place of tramcars in their own locality.

The recent attempt on the part of taxicab drivers to coerce the railway companies into giving them free and uncontrolled use of their station yards seems to be merely another piece of evidence in favour of the theory that the development of the taxicab is at present largely on a wrong basis. In the old days of the horsed cabs the cabman was to all intents and purposes his own master. As such he made a fairly satisfactory living by alternately cajoling and bullying the public into the payment of exorbitant fares. He made the great mistake, however, of supposing that this state of affairs was everlasting. He was more noteworthy for a certain crude eloquence and caustic humour than for his breadth of view, and so it came about that when the taximeter was introduced he saw in it nothing but an objectionable means of curtailing his profits. The result of this was that the early taxicab companies—in which the drivers figured as employees instead of as the hirers of cars—were given an opportunity of gaining rapid popularity with the public. The motor cabs in themselves were novelties, and the taximeter was a welcome assurance against overcharge. The motor cab drivers at that time did not find the conditions of employment irksome, because the cream of the business came automatically their way. The difficulty of treating the cab driver as an employee became evident, however, as soon as competition between companies grew acute and profits were consequently reduced to a narrow margin. The companies, in the interests of their shareholders, were obliged to indulge in stringent economies and rigid supervision. Drivers who had been quietly annexing any payments for extras found it increasingly difficult to do so, and various promising schemes for getting the better of their employers were more or less nipped in the bud. Meanwhile the price of petrol went up, and as the drivers had to supply their own fuel, this hit them rather hard. From that time up to the present day the fundamental error underlying the whole constitution of the taxicab companies has become more and more apparent. The roving life of a cabman, who cannot be subjected to the constant attentions of an overseer or foreman, encourages independence of character and the development of considerable ingenuity and craft. No amount of regulations will make it impossible for the taxi driver to pocket a certain sum of money that rightfully belongs to his employer. The men no doubt feel that they have grievances, on account of which they consider themselves justified in "making" what they can out of the companies. In any case their morals in small matters become lax, and they exhibit the same tendency as the old cabby to bully the public and disregard its interests whenever they find that they have the upper hand. Probably the root of the matter lies in the cabman's mode of life, and as this cannot be materially altered it is impossible to find any complete remedy. The weakness of the system of the operating companies lies partly in the fact that their men have plenty of time in which to discuss grievances and exchange ingenious ideas for gaining small profits, and partly in the fact that the men take little or no personal interest in their cars, and consequently are more often than not bad and dangerous drivers. Probably the best compromise would be the elimination of the companies in favour of small proprietors and owner-drivers. This system is, of course, inferior as regards facilities for maintenance and repair, but it introduces the element of personal interest and the power of private bargaining not necessarily accompanied by any dishonesty. In the long run, it gives the advantage to a man who is a good driver, and who handles his public tactfully and with a reasonable measure of courtesy. It would be worth the while of any licensing authority to consider whether it is not to the advantage of a locality that its motor cabs should be owned by their drivers, or at least by people who run very small fleets, rather than that the whole business should fall into the hands of one or two companies, and satisfactory service be dependent upon the variable relations between those companies and their men.

GREAT RISE IN PETROL.

A sensation was produced on September 3 by the public announcement being made that as from that date the price of petrol was increased by 8½d. a gallon. The Shell Marketing Company sent out the following circular:—

"We regret to have to inform our customers that owing to the enhanced cost of ocean transportation, consequent on the great increase in the rates charged under the Government's War Risk Insurance, we are compelled as from Monday, September 3, to advance our prices to the extent of 8½d. per gallon to meet the above-mentioned extra causes."

The Anglo-American Oil Company's circular ran:—

"Owing to the enhanced cost of petroleum products, and in particular to the advance in the cost of ocean transportation, consequent on the great increase in the rates charged for War Risk Insurance and other causes arising out of the war, the company are compelled, as from Monday, September 3, to advance their prices to a level which will help to meet the extra cost."

The former document refers to motor spirit and the latter to petroleum for fuel, lighting, etc.

While previous increases of price were due to the higher cost in the countries of production, the present rise is attributed wholly or almost wholly to the new Government shipping insurance charges. It is, in fact, plain that the Government have struck a heavy blow at a great industry. In the middle of August the Government scheme of war risk insurance then in force was very considerably modified, with the result that while the position of the owners of requisitioned tonnage was improved, insurance rates for the so-called "free ships" were very substantially advanced. The total cost of war insurance for oil tank vessels, which, on the average, make about seven round voyages across the North Atlantic, is now admittedly very heavy. The charge falls particularly heavily on the shipowners, because of the greatly enhanced values of tonnage. A new ship may cost between five and six times the amount of the pre-war value, and such increased values have naturally to be insured by the owners. According to some authorities the rise in the insurance rate is from 4 per cent. (the old figure) to 18 per cent. of the market value of the ship.

The ordinary retail price of petrol recently was about 3s. 4d. per gallon, and the increase brings it to about 4s. Under existing contracts motor cabs in London were reported to be getting the spirit at 2s. 3d. per gallon, or 2s. 6d. without the rebate of duty. Omnibuses were on a similar basis. As existing contracts run out higher prices will have to be paid. That will mean additions to fares. In the case of manufacturers, shopkeepers, and others who use petrol vehicles for transporting goods and parcels, there will also be an additional burden, but it will not be so severe as on those whose business is transportation alone.

FARES AT BRIGHTON AND HOVE.—Provided that Brighton Corporation also agrees to the proposed revised scale of fares, the Corporation of Hove have approved of increased fares being charged on the motor omnibuses run by Tillings, Limited.

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COAL GAS FOR MOTOR TRACTION.*

REPORT OF THE EXECUTIVE COMMITTEE OF THE BRITISH COMMERCIAL GAS ASSOCIATION.

It is on record that the use of coal gas for motor traction is at least 20 years old, so that its practicability for certain kinds of work is beyond question. Recently, however, the shortage in the supply of petrol, and its high price, has revived interest in the use of gas, and in order to get some definite information on the subject, the B.C.G.A. undertook a series of experiments. Without unduly labouring the point, it may be stated that many unavoidable delays occurred in the pursuit of the experiments due to the abnormal conditions prevailing at the present time. Such observations as have been made will, it is hoped, serve to clear up the technical aspects of the question and enable those interested to consider the matter from their respective points of view.

The use of gas for traction is, as has been said, by no means a new subject. There is, of course, no essential difference between a gas engine and a petrol engine; they both use combustible gases with air for the development of their power, and their methods of operation are such as to make the adaptation of one to the other a fairly simple matter. To convert a gas to a petrol engine, the principal alteration needed is the addition of a carburettor, and the adaptation of gas to a petrol engine simply renders the carburettor a superfluity.

ADVANTAGES AND DISADVANTAGES OF GAS.

There are special advantages attaching to each form of fuel—gas and petrol. Petrol, for instance, possesses the immense advantage of containing a large amount of energy in a small space. Gas, on the other hand, is for practical purposes a "perfect gas," not a vapour, and therefore conduces to clean cylinders and pistons, absence of trouble due to injector stoppage, and the complete elimination of starting difficulties in cold weather.

Gas, however, for equal energy value is very much more bulky than petrol, and herein lies the only real difficulty in connection with the use of gas as a substitute.

THE RUNNING-IN OF PETROL ENGINES BY GAS.

It is well known that gas can be, and is, economically employed for "running in" automobile and aeroplane engines with a success which might easily have been anticipated. In these cases, however, the engine is mounted on a test bench, and gas taken from an ordinary gas main, so that questions of storage, breaking down of high pressures, and replenishment of fuel do not enter into the question. The problem is therefore a relatively simple one. One point, however, in this kind of work which has come to notice recently might with advantage be placed on record here.

In a large establishment where automobile engines were being "run in" on gas it was found that the piston and cylinder walls became corroded. This was regarded as a serious objection, involving as it did the risk of the pistons jamming. It was found that the trouble was due to excessive cooling of the engine. The circulating pump operated by the engine was fed from a water main having a head of from 20 lb. to 30 lb. per square in. The pump being of the non-positive type permitted the water to flow through the jackets by virtue of the head on the main even when the engine was stopped. Under these conditions a much larger volume of water passed through the jackets than would have been the case if the water had been allowed to flow under the propulsive action of the pump alone, so that excessive cooling of the products of combustion took place and ultimately caused corrosion.

The solution of the difficulty consisted in the provision of a small tank with float valve set about level with the engine. Water supplied to the engine from a tank arranged in this way would naturally flow at a rate dependent on the speed of the circulating pump, and therefore on the speed of the engine, which, after all, is but a reproduction of normal working conditions.

Similar precautions would have to be taken with engines cooled by "Thermo-Syphon."

When gas is used on a mobile vehicle several limiting conditions present themselves, inasmuch as the gas for driving the engine must be carried by the vehicle itself. The question of storage, therefore, arises first.

THE USE OF THE GAS BAG.

From information that has appeared in the technical press, the use of gas for motor traction has been successfully worked out by Messrs. Barton Brothers, of Beeston. Their arrangement consists of a flexible balloon-like holder carried on the roof of the vehicle. The holder is made of woven fabric treated so as to be impervious to gas and to withstand the effects of the weather. They are made in various sizes from 150 to 500 cubic ft. capacity. The gas is therefore stored under a very slight pressure, probably only a few tenths of an inch head (water-gauge) above atmosphere, and this pressure is steadily maintained as the holder exhausts itself in feeding the engine. So far as the engine is concerned, the low pressure of the gas in the flexible holder is of no consequence. The gas flows into the engine just as the air does; that is by the inductive power due to the operation of the engine itself.

ADVANTAGES OF THIS SYSTEM.

This method of carrying the gas has several obvious advantages, namely:—

(1) The holder can be easily and cheaply replenished with gas from any ordinary supply.
(2) It behaves as its own constant-pressure governor, thus obviating the necessity for auxiliary governing accessories.
(3) There is no need for gas-compressing machinery.
(4) The holder is cheap to instal.
(5) It adds very little to the weight of the vehicle.

A small advantage arises from the fact that the gas is stored at practically its normal density, and therefore exerts a certain buoyant effect, but as this amounts to only 35 to 40 lb. per 1,000 cubic ft. of gas on the vehicle, it cannot be regarded as of much consequence,

DISADVANTAGES OF THE GAS BAG.

The practical disadvantages of this system are the extremely fragile nature of the holder and its bulky dimensions, which seem to unfit it for hard work in the towns.

Nevertheless, the simplicity and low cost of the system warrants careful consideration as a war measure, because although the volume of gas that can be carried at atmospheric pressure is limited owing to its bulk, this is to some extent compensated for by the ease with which the gas holder can be replenished. Indeed, in the present state of the iron trade, it is difficult to see how gas can be applied in any other way.

It should be fairly easy to provide at many places facilities for replenishment through an ordinary meter of sufficient size, and in certain cases it might be practicable to supply gas through prepayment meters.

It may be advisable to mention here that owing to the very small pressure exerted by the gas contained in a flexible holder—only about two-tenths of an inch water-gauge—a meter discharging into it would discharge practically as though it was open to the atmosphere, and would therefore race unless some form of throttle were used. A short length of small pipe or a diaphragm with a suitable aperture fitted on the inlet to the meter is recommended, so as to keep the "pressure drop" in the meter itself within safe limits.

THE STEEL CYLINDER SYSTEM.

To overcome the two serious drawbacks of what might be called the "Beeston" system, namely, the fragility and bulky character of the gas holder, the use of gas compressed at high pressure in strong steel containers presents itself. This permits of the bulk being reduced to a reasonable figure, and also provides an apparatus robust enough to bear any reasonably hard wear. In doing this, however, all the advantages of the "Beeston" system have to be sacrificed, so that an entirely new set of conditions arise.

From a practical engineering point of view the use of gas compressed into steel containers is far the better, but its adoption is for the future. The present state of the steel market is such as to preclude any serious work in this direction for some time to come, but nevertheless a few general remarks on this aspect of the question might not be without interest.

THE QUESTION OF PRESSURE.

The compression of gases is now a well understood commercial business. The British Oxygen Company have a large organisation for dealing in gases stored at 120 atmospheres (1,800 lb. per square in.), and this may be regarded as practically the maximum pressure that can be easily dealt with, although pressures as high as 200 atmospheres (3,000 lb. per square in.) have been used on the Continent.

When the question of gas for motor traction was raised last year, there was a considerable weight of opinion in favour of the use of

* In our issue of August 16 last, we referred to this report of the Executive Committee of the British Commercial Gas Association on the important subject of coal gas for motor traction. Although the main arguments and conclusions were then dealt with, the report is so informative and contains so much of value at the present time, that we reproduce it in full.

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gas at 120 atmospheres. There are, however, several objections to this, namely :—

(1) The high cost of compression.
(2) The care and supervision required in dealing with cylinders stressed to this degree.
(3) The liability of the metal to more rapid "fatigue" due to continual vibration.
(4) The depreciation of the gas by subjection to such a high pressure.

It was intended to make some experiments with gas stored at this extreme pressure, but it was found to be impossible owing to the lack of the necessary material and apparatus.

Experiments were, however, made on the lines along which ultimate success will probably lie, if gas is at all practicable on a large scale, namely, the use of moderate pressure up to 20 to 25 atmospheres (300 to 375 lb. per square in.). For this purpose we were fortunate in procuring from the G.W.R. some steel cylinders capable of supporting a pressure of 20 atmospheres. The question of getting the gas at a sufficiently high pressure then arose, and although an endeavour was made to adapt some existing apparatus for the work, it was in the end decided to make use of the compressed gas supplied by the British Oxygen Company. This is supplied in cylinders compressed to 120 atmospheres, and it was found quite practicable for experimental purposes to transfer this gas to the low-pressure storage cylinders through a reducing valve discharging at 20 atmospheres, flexible tube of heavy section being used for connecting up.

Gas in Use on a Tramway.

It is on record that the Neath Tramways are operated by gas power, the gas being carried under an initial pressure of about 200 lb. per square in. There is, however, a considerable difference between the operation of tramway vehicles and ordinary commercial motors. For instance, the resistance to traction on an ordinary road might be anything up to three or four times as much as the resistance on a tramway track; also with a car operating between fixed limits not very far apart, a relatively small charge of gas would be sufficient for a "to and fro" journey, thus minimising the dead weight of the storage reservoirs. The reservoirs could, if necessary, be replenished after each "out" and "home" journey.

Effects of Compression on the Gas.

It will be useful at this stage to consider some of the effects of compression of gas to a pressure suitable for use in a mobile engine.

Ordinary town's gas is not a "perfect" gas. Even when compressed to a moderate pressure of only a few pounds per square inch above atmosphere, the "partial-pressure" of the water it contains is not sufficient to keep the whole of it in the vaporous state when the slight elevation of temperature due to compression disappears.

At 60 deg. F. the tension of aqueous vapour is ·518 of an inch of mercury, which, with gas at standard atmospheric pressure, corresponds to the presence of 1·7 per cent. of water vapour in the gas. If the pressure of the gas is raised to, say, 10 in. of mercury above atmosphere the volume of the gas will change in the proportion of 4 to 3, so that when the gas regains its normal temperature of 60 deg. F. one-fourth of the water it originally contained in the form of water vapour will separate out in the liquid state, that is supposing it was saturated with water vapour before compression.

It is not until considerably higher pressures are attained that the hydrocarbon bodies in the gas are appreciably affected. Naturally, the precipitation of any of these detracts from the calorific value of the gas. The effect of compression to 120 atmospheres appears from observation to reduce the calorific value by about 10 per cent. A cylinder of gas at 120 atmospheres was discharged through a reducing valve into a calorimeter and frequent observations made of the heat developed. It was found that the calorific value remained almost absolutely constant during the time the gas was discharging and the pressure falling. There was, however, a rise in the number of B.T.U. developed during the last few minutes when the pressure was falling from about 3 atmospheres to atmospheric datum, presumably due to the partial re-evaporation of some of the hydrocarbons which had been precipitated. The main point, however, is that almost the whole gas can be discharged at a practically constant calorific value, and this value is 10 per cent. lower than before compression.

Negligible Effect of 25 Atmospheres.

Regarding the effect of the calorific value due to compression to 20 atmospheres, there has been no opportunity of determining this under present conditions, but from some observations made about seven years ago it was found that the loss due to compression to 300 lb. per square in. (about 20 atmospheres) was from 3 to 4 per cent., so that making due allowance for the difference in constitution of the gas at the present day the effect of compression would be less than 3 per cent. and probably practically negligible.

It should be pointed out that the loss of calorific value at 20 and 120 atmospheres pressure, as described above, was determined after the gas had been re-expanded and allowed to regain its full 100 per cent. humidity by passage through a wet meter. The compression even to only 20 atmospheres would cause the gas to deposit 95 per cent. of its normal water contents, and so become, when re-expanded out of contact with water, for all practical purposes dry, so that in regaining its 100 per cent. humidity about 1·7 per cent. of diluent (water vapour) was added. In practice the gas would have very little opportunity of taking up water on its release from the storage cylinders, so that it would be used in a practically dry state, and the avoidance in this way of the 1·7 per cent. dilution by water vapour would practically compensate for the loss of calorific value due to deposit of hydrocarbons at 20 to 25 atmospheres compression.

Liquid Deposits in Cylinders.

A question arises as to the nature of the hydrocarbons thrown down by compression. Naphthalene will be precipitated, but observations go to show that there is always a sufficiency of liquid bodies to prevent the naphthalene assuming the solid form. These liquid bodies, however, have a tendency to polymerise, so that it appears desirable that containers for high-pressure gas be fitted with drain cocks, and perhaps provision should be made for the occasional use of a small hand-operated spraying device to facilitate the outflow of viscid deposits. This should not prove a serious matter.

At first it would appear that the only effect of an accumulation of viscous or sticky deposits in the storage cylinders would be slightly to reduce their capacity. It points, however, to an important practical distinction between the use of moderate storage pressures (up to 25 atmospheres) and extreme pressures up to 120 atmospheres, with a great advantage in favour of the former for the following reasons :—While there will certainly be a larger deposit of hydrocarbons at the extreme pressure, there will at the same time be greater difficulty in cleaning out the containers. In fairly large containers working at 25 atmospheres, it would be quite practicable to affix a hand-operated sprayer for the injection of a paraffin spray at certain intervals, but with extreme high-pressure gas containers this does not seem a sound proposition for practical reasons. In the latter case it would probably be found necessary to expel the deposited matter by means of heat, which would mean the dismantling of the cylinders—an expensive job. Also the periodical re-heating would in time adversely affect the ultimate strength of the cylinder by corrosion of its surface and consequent loss of sectional area, and this seems to be a weighty reason in addition to those already enumerated against the adoption of pressures higher than 25 atmospheres. Another point is that with 120 atmospheres the reservoirs would be smaller and the deposits greater than at 25 atmospheres, so that the volumetric capacity of the reservoirs would suffer serious diminution unless they were frequently cleaned.

A Trial Run.

A car having been equipped with gas reservoirs it was run round a district having just about the average kind of road and variations of level, and the observations made indicate *a radius of action of 25 miles per 1,000 cubic ft.* The average speed was nine miles per hour, including the stopping and slowing down which was several times necessary at crossings, etc., but which is, of course, consistent with everyday conditions.

It was intended to make some comparative brake tests with the engine, and so see if and to what extent its power was lessened by the substitution of gas for petrol. This has not been possible, but Messrs. White and Poppe, of Coventry, have kindly given permission for the results of some observations made by them to be included in this report. (See a paper read by Mr. G. B. Jones, of Coventry, *Gas Journal*, March 27, 1917.) These observations were made with gas that had not been compressed to more than a few inches head of water, but so far as the data of relative power are concerned, there is no reason for doubting that they apply equally well to gas that has been compressed, making due allowance for loss of calorific value due to compression, which, however, as has already been pointed out, may be regarded as negligible for pressures not exceeding 25 atmospheres.

The results obtained at Coventry show that the brake power developed by a petrol motor when driven by gas is about 85 per cent. of the power developed by petrol, and that this proportion is fairly constant over a wide range of speeds; also for equal brake-power on test bench, *one gallon of petrol appears to be equivalent to 250 cubic ft. of gas.*

Our own observations derived from general running of a vehicle on petrol and gas point to a ratio less favourable to gas, namely, that one gallon of petrol is equivalent to 300 cubic ft. of gas.

Much, however, of course, depends upon the quality of the gas and the kind of petrol used, there being several qualities of both procurable at the present time.

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Data Relevant to Storage under Pressure.

The weight and volume of the steel containers for storing the charge of gas are factors of importance, but their significance will vary with the type of vehicle under consideration. The following figures are interesting and useful on this point :—

Dimensions of Reservoirs.				Weight of Reservoirs per 1,000 c. ft. of free gas.	Press. atm.	Vol. of free gas. (c. ft.)	Price.
Length ins.	Diam. ins.	Vol. c. ft.	Weight lbs.				
G.W.R.—							
84	18	11·2	326	1455	20	224	—
99	14	10·37	—	—	20	207	—
84	36	44·8	1668	1860	20	896	—
Uxbridge Steel Barrel Co.*—							
72	26	20·0	780	1560	25	500	238s.
72	20	12·0	480	1600	25	300	177s.
72	15	6·0	285	1900	25	150	102s.
British Oxygen Company.—							
49	7	·83	108	1080	120	100	93s.

* The cylinders by the Uxbridge Steel Barrel Co. conform to the following specification :—

To be made of mild steel plate with welded joints, the plate having a tensile strength of 25/26 tons per square inch. The bosses for attachment of connecting tubes to be welded to the cylinders. The cylinder ends to be domed outwards with a radius equal to the diameter of the cylinder.

It is clear that in adopting gas a considerable proportion of the carrying capacity of the vehicle would have to be sacrificed, or, to put it in another way, the wear and tear on tires and other running parts would be increased per ton of goods carried.

The use of gas at 120 atmospheres pressure would mean a tangible economy in regard to weight, and this could no doubt be reduced still further by the use of stronger material, such as nickel steel. There remains, however, the fact that these cylinders work at a low factor of safety, which in turn necessitates a degree of supervision which seems hardly practicable with reservoirs used for the storage of gas for motor traction. These extreme high pressure cylinders also work out more expensive per 1,000 cubic ft. of free gas than cylinders for the more moderate pressure of 25 atmospheres, but this in itself is an item which would soon repay its cost by the higher carrying capacity of the vehicle, due to the smaller dead weight.

The Disposition of the Storage Cylinders.

As regards the disposition of the vessels on the vehicle, this will depend upon the type of vehicle and other circumstances, and need not be further discussed here beyond stating that it might be found convenient to use several vessels of various sizes according to the dimensions of the vacant spaces on the car, although the weight per 1,000 cubic ft. of gas is less the larger the vessel used.

It is worth pointing out, too, that the loss in the carrying capacity of the car, due to the weight of the gas reservoirs, provides at the same time space for their installation. The several storage units would be coupled together by means of solid drawn ⅜-in. copper tube, which weighs only 4½ lb. per 10-ft. run, and can be safely used up to a pressure of 500 lb. per square in.

Respecting the question of weight, there is reason for thinking that in post-war time this will be found less formidable than at present. One of the good results of the war has been the manufacture of steel of immensely greater tensile strength than were known three years ago, and we think it is not an exaggeration to say that the weights mentioned above will be found capable of a reduction of 50 per cent. or more.

Compressing Machinery.

Gas compressing machinery is a well-understood branch of engineering, but for the experiments it was found, owing to war conditions, almost impossible to get a machine in London for the purpose, so that, as has already been mentioned, it was necessary to use gas stored at 120 atmospheres by letting it down to 20 atmospheres through a reducing valve.

The following information on this head is useful :—

Output of Compressor.		Pressure lbs. per sq. in.	Power required at belt.	Cost of Compressing Machine only.
c. ft. per min.	c. ft. per hr.			
25	1,500	300	6½ H.P.	£275
137	8,200	300	34 H.P.	£400

To this must be added the cost of engine and erection, and a certain amount of storage in the form of a battery of reservoirs used in conjunction with the compressors at the replenishing station.

It is useful to note that for compression to 120 atmospheres the power required would be between two and two and a half times as much as is necessary for compression to 20 atmospheres, depending upon the type and efficiency of the machine used.

The amount of storage provided at the compressing station, and the size of compressors, will depend, of course, upon the demand for compressed gas, but in any case the use of storage in conjunction with the compressor would shorten the time needed to replenish the reservoirs on a car. These station storage units should, for economical as well as mechanical reasons, be of the multiple type rather than in the form of a single reservoir, and should be worked at a pressure rather higher than that required on the car, so as to compensate for the drop of pressure that would take place when the gas was transferred. If when the pressures in the car cylinders and the station storage cylinders had adjusted themselves this pressure were below the working pressure for the car, direct communication with the compressor would allow of the necessary addition being made. A suitable arrangement of valves would permit of this being quickly done. If the compressor were not supplemented by a certain amount of storage capacity in the form of auxiliary reservoirs, it would have to be of such size as to permit a car to be replenished in, say, five minutes, which would mean a compressor of 12,000 to 18,000 cubic ft. per hour capacity, and unless the demand for gas were high this would add unduly to the standing charges, and therefore to the cost of compression.

It may also be mentioned here that no trouble has been experienced due to the reduction of temperature consequent upon the expansion of the gas after release from the storage cylinder. The gas was observed to chill immediately after release, but nothing else ; the conductivity of the metal surroundings being sufficient to make up for the absorption of heat due to the expansion of gas.

The "Beeston" System in Growing Use.

It may be mentioned that the low pressure or "Beeston" system is already being adopted owing to its simplicity. The weight of the envelope is (as has already been mentioned) such that the gas exerts a pressure equal to only one or two-tenths of an inch head of water, and when it is remembered that a normal adult person can blow by means of the lungs a pressure of about 80 in. head of water, it will readily be seen that the pressure in the envelope is extremely small. There is no need for it to be large so far as the engine is concerned, because the suction due to the operation of the engine is more than ample to draw in the gas.

Regarding the equivalents of gas and petrol, the gas supplies in different parts of the country are, like electric supplies, not standardised either as to price or quality, and it will be found that the gas obtained at some places will give a better mileage than gas obtained at another place. The gas equivalent is, however, unlikely ever to be higher than 300 cubic ft. per gallon of petrol, but may be as low as and even lower than 250 cubic ft. These figures, together with local prices for gas and petrol, will enable those interested to calculate the relative costs of running.

SOME OBSERVATIONS ON THE NEATH GAS CARS.

Lay Out.

The general lay out of the system is as follows :—The compressing depot is situated in a central position at Neath, from which the track extends southwards in one direction two and a half miles to Britton Ferry and in the westward direction two miles to Skewen, the total length being four and a half miles. Only three cars are running at present, three others being laid up for repairs, which under present conditions are difficult to carry out.

Working.

The gas reservoirs on the car are replenished to a pressure of about 140 lb. per square in. each time they return to the central depot, so that the longest journey travelled on one charge is the five miles out to and back from Britton Ferry. The replenishment is a very simple matter, and takes only two minutes.

At every second return of the car to the depot (that is after a journey of nine miles), the cooling water of the driving engine has to be changed. This is due to imperfect cooling arrangements and to the close confinement of the engine and accessories ; a condition that does not exist in an ordinary automobile vehicle.

Engine and Track.

This is a 15-H.P. two-cylinder engine, the piston diameter and stroke being 8½ and 10 in. respectively, and runs at a speed of 264 revolutions per minute. It is balanced by a flywheel about 4 ft. in diameter, which is enclosed in a case outside but close up to the side of the vehicle. The engine drives through a two-speed and reverse gear, and when once started generally continues in motion until the end of the day.

The track has a few gradients, the worst being 1/27 and 800 ft. long. With a full load the car ascends this gradient at slow speed, but with only a small margin of power.

Compressing Installation.

There are two two-stage compressors, each separately belt-driven by a 6-H.P. gas engine. Generally one compressing set can provide sufficient gas for the cars, so that the second set acts as a stand-by.

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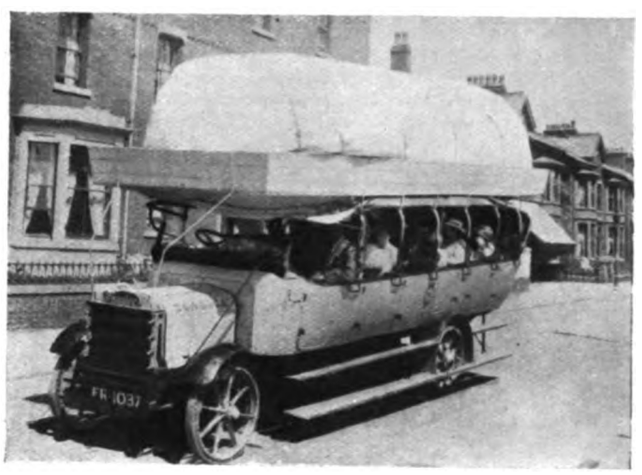
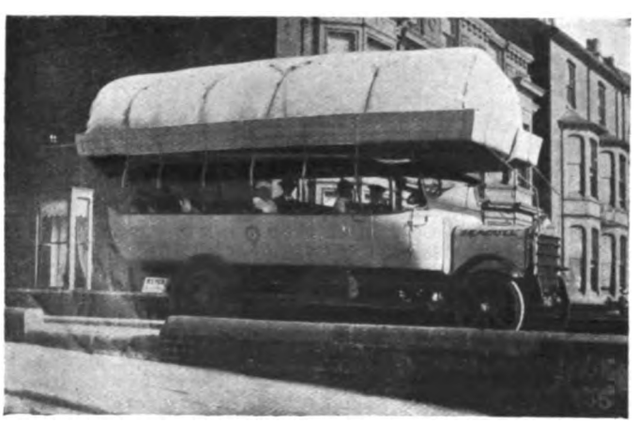
MOTOR TRAFFIC.

Each compressor has a maximum output of 40 cubic ft. per minute, that is, 2,400 cubic ft. per hour. They discharge into a set of three storage reservoirs each 20 ft. long by 4 ft. 3 in. diameter with domed ends, and having a volume of about 300 cubic ft. At 200 lb. per square in. each of these reservoirs would hold about 4,000 cubic ft. of gas, that is, a total of 12,000 cubic ft. for the three. The connections on the reservoirs allow of their use jointly or separately. The compressing plant is generally run for about 12 hours a day, whereas the cars are running for about 16½ hours, the difference of 4½ hours being provided for by the gas stored in the reservoirs.

The Cars.

There are two types of car, but they differ only in regard to size, being 7½ tons and 8½ tons respectively, the smaller one carrying 40 passengers and the larger one 52, but are driven by engines of the same size, namely, 15 H.P. They travel when fully loaded at a maximum speed of ten miles per hour.





Daimler Chars-a-bancs Using Coal Gas.

[One of four Daimler Chars-a-bancs supplied to Messrs. S. & J. Wood, Ltd., South Shore, Blackpool. This vehicle is fitted, as will be seen from the photograph, for using coal gas as fuel, and it is giving very satisfactory service.]

The gas is carried in three domed-end cylindrical reservoirs, one at each end of the car underhung from the chassis (these are 4 ft. long by 1 ft. 9 in. diameter), the third being 13 ft. 6 in. long and 1 ft. 6 in. diameter, and is arranged underneath one of the seats inside the car. This third cylinder practically balances the weight of the driving engine, which is arranged under the opposite seat. The total volume of the three cylinders amounts to about 45 cubic ft., and assuming the initial storage pressure to be 140 to 150 lb. per square in., would contain between 400 and 450 cubic ft. of available gas when fully charged. The consumption of gas (including the gas used by the compressing engines) works out at 78 cubic ft. per car mile, and if we deduct 10 per cent.* as the amount actually used by the compressing engines, we get 70 cubic ft. of gas per car mile as the amount actually used for traction, or about 14 miles per 1,000 cubic ft. Therefore with a single charge of 450 cubic ft. of gas a car would be capable of travelling a maximum distance of about six and a half miles. The longest journey actually travelled is from the depot at Neath to Britton Ferry and back, a distance of five miles, so that generally the car carries a reserve of gas equal to about a one and a half mile journey.

* No data were available showing the gas used for compression only, but 10 per cent. may be regarded as a fairly accurate estimate, on the assumption that the compression is carried to 200 lbs. per square inch.

Costs of Running.

For the 12 months ended July, 1916, they were as follows :—

Total expenses	...	9·5d. per car mile.
Expenses for gas only	...	3·1d. ,, ,,
Gas used for traction	...	70 cubic ft. per car mile.
Gas used for compression	...	8 ,, ,, ,,
Total	...	78 cubic ft. per car mile.

78 cubic ft. at 3s. 4d. equals 3·12d. per car mile for gas only.

Having regard to the small size of the Neath tramway service, and the fact that the apparatus is very much out of date, the total expense of working, namely, 9·5d. per car mile, seems a very satisfactory figure. In the absence of details it is difficult to compare this figure with other forms of traction, but it is worth noting that it is on record that the total expenses for running the London omnibuses during 1912 was 7·32d. per omnibus mile. Taking into account the facts that materials, etc., were fairly cheap in 1912; that the London omnibuses have the advantages of a large organisation; and also that their weight is about 25 per cent. less than the Neath cars, the gas-driven cars compare favourably with them.

Effects of Compression to 200 lb. per Square Inch.

An examination was made of the gas used, and of the oily substances deposited in the storage reservoirs, and the results show that the effect is negligible. The loss of heat value is less than 1 per cent., and this is more than compensated for by the almost complete dehydration of the gas due to its concentration by pressure. These observations confirm to some extent the conclusions come to respecting the effect upon the gas of subjecting it to a pressure of 25 atmospheres.

U.S.A. WAR TAX ON MOTOR SALES.

Manufacturers' Objections.

The National Automobile Chamber of Commerce of the United States have raised opposition to the proposed war tax of 5 per cent. on the total sales of motor vehicles. The Chamber's statement mentions that the industry includes approximately 450 manufacturers, of which 12 makers produce 80 per cent. and 438 produce 20 per cent. of the whole. The twelve have been prosperous, while the bulk of the others are able to exist only in good times. The volume of sales has been decreased since the war. Increased prices would further restrict the volume of sales. Hence the maker would have to bear the full weight of the tax, which would cripple the majority of the small and financially weak companies. Labour costs have increased 25 per cent. and more in the past year or two. Materials have increased anywhere from 30 to 400 per cent. These rises in the cost of production have been met because of the larger volume of sales which the war is curtailing. In crippling the motor vehicle industry 825 parts and accessories makers, 25,924 dealers, and 23,686 garages would also be affected. Few of the manufacturers show over 12 per cent. profit on their turnover. This tax, assuming that it could not be passed on to the consumer, would take five-twelfths of the profits, or be a 41·6 per cent. tax on the net earnings of the industry. Very few of the manufacturers after paying this 5 per cent. would have anything left to pay under the excess profits tax. Their net earnings, if any, would be less than 8 per cent. on their investment. More than 600 motor vehicle manufacturers have failed during the past five years.

U.S.A. Industrial Vehicle Exports.—For May last the export of industrial motor vehicles from the United States totalled 1,764, valued at £643,325, as compared with 1,717 and £871,445 in the corresponding month of 1916.

Development of Aeroplane Engines.—Speaking in New York, Lord Northcliffe suggested that the one great hope of allied victory rested in the aeroplane. The war had taught that the aeroplane engine of the spring might be almost useless for actual fighting next autumn, so rapidly are developments produced by the fierce competition of war. The U.S.A. has provided for building over 22,000 aeroplanes.

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MOTOR TRAFFIC.

COMBINED MOBILE ARC WELDER AND PNEUMATIC CHIPPING PLANT.

The " Tilling-Stevens " mobile arc welder and travelling workshop has now been rendered more extensively serviceable for executing repairs to engineering plant of every description by the addition of a pneumatic tool outfit. The equipment provides a means of conveying the whole of the apparatus and operators from the owner's door direct to the spot where the work is to be executed, power for driving the pneumatic tools for the preparation and finishing of the work, and current for one electric arc.

The advantage of having the entire equipment mobile, enabling the whole of the gear and workmen to arrive on the job at the same time, will be appreciated by those who have had experence in arranging for the despatch of similar plant by railway. Generally the plant arrives either a long time before or after the workmen have got on to the job, and the delay in collection and delivery

Fig. 2.—Interior View Looking Towards Driver's Seat.

(owing to the fact that in a number of instances there is no tackle to deal with the heavy weights concerned) not only causes a great deal of delay and annoyance, but is also very costly. The particular unit of which interior views are here given was built to the order of Messrs. P. A. Mudd and Company, who are ship repairers and electric arc welders, and the following description, for which we are indebted to Messrs. Tilling-Stevens, conveys a clear idea of the equipment.

The chassis is the standard 40-H.P. Tilling-Stevens petrol electric, fitted with specially wound dynamo and motor for arc welding purposes. In this type of chassis the prime mover, which is a 40-H.P. petrol engine, is direct-coupled to an electric generator, which supplies current to an electric motor, and this in turn drives the back axle through cardan shaft and worm gearing.

The control of the vehicle is effected by means of the engine throttle and a resistance, which varies the strength of the generator and motor fields, the entire range of the speed of the vehicle being controlled by the throttle pedal and resistance lever. Reversibility is obtained by changing the direction of current in the motor field by means of a controller, which also provides a neutral position. Switchgear is arranged for diverting the current from the electric driving motor to the arc welding apparatus, the power being supplied by the same engine and dynamo which normally propels the chassis.

All other mechanical details of the chassis are similar to the standard type which is supplied for passenger and goods carrying. The body is of the box type, and is provided on the near side with hinged glass windows for lighting and ventilation (Fig. 1), and on the off side with one window and louvres for ventilating. The panels are of mahogany, and the whole of the vehicle is painted and finished off in first-class style.

The driver's cab is boarded up on the off side, and there is a hinged door on the near side. A sheet steel weather screen is provided. At the back of the cab folding doors give access to the welding

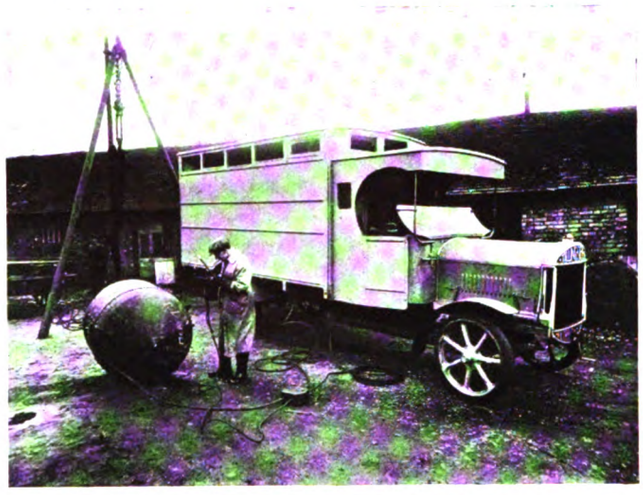

Fig. 1.—Equipment at Work Welding R.M.S. Tank.

control gear, enabling the driver to operate this from the seat. In the interior of the body on the near side there is a locker seat extending for about half the length, and a bench fitted with vice with provision underneath to accommodate the pneumatic hose and cable for welding occupies the remainder of this side of the body (Fig. 3).

The switch gear and resistances for welding are fitted in the front portion of the body on the off side (Fig. 3). The cables from this gear run down through the floor to terminals on either side of the body, to which the welding leads can be connected for running to the point where the arc is required. The welding leads are in

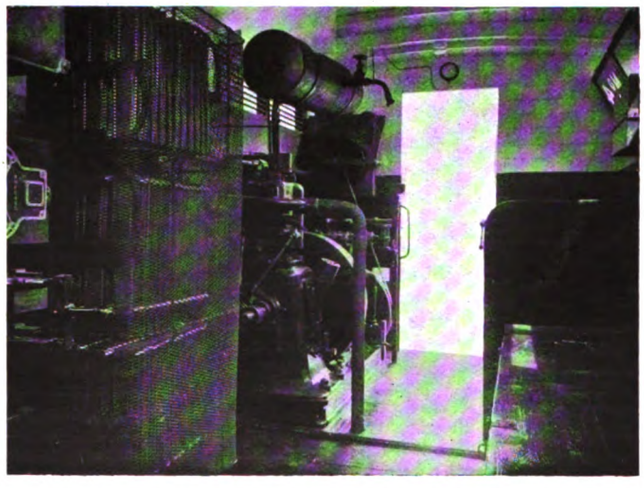

Fig. 3.—Interior View Looking Towards the Rear.

convenient thimbled lengths, and junction boxes are provided for the insulation and protection of the temporary connections.

The air compressing plant is fitted behind the welding gear on the same side of the body (Fig. 2), and is capable of operating a No. 1 Boyer chipping hammer at a distance of 500 ft. from the vehicle. The air compressor is manufactured by Lacy-Hulbert and Company, Limited, and is their " Boreas " standard type, class D.V.1, delivering about 30 cubic feet of free air per minute

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MOTOR TRAFFIC.

at a pressure of 100 lbs. An automatic unloading device is fitted which cuts the compressor out of action when the pneumatic tools are not being used. The compressor is driven by a 5½-H.P. Gardner petrol engine.

The engine is cooled by means of a radiator fitted at the back of the vehicle, and a fan driven from the compressor draws air from the outside of the body through the radiator. The air compressor is cooled by means of water circulated by a pump round the compressor jackets, and the supply for this is carried in a tank slung underneath the floor of the body. A receiver is slung from the roof. Five hundred feet of armoured hose in 50-ft. lengths, fitted with instantaneous couplings, is supplied, and this length is considered sufficient for the general run of ship repair work.

In addition to the pneumatic chipping hammers, driven by the compressed air plant, the plant can be utilised advantageously for driving pneumatic rivetting hammers, drilling machines, grinders, sand blast apparatus, and other pneumatic appliances and tools. The welding plant is suitable for welding M.S. plates from ⅛ in. thick to 2 in. thick and upwards, all descriptions of steel and iron forgings and castings. Uncaulkable places in boilers can be welded,

Fig. 4.—Pneumatic Chipping Hammer at Work.

corroded landing edges built up, cracks in furnaces and flues made good, etc. Boiler repairs can be executed to the satisfaction of Lloyds, B.O.T., and insurance companies' inspectors.

Tilling-Stevens also manufacture complete portable and fixed welding plants. The mobile form of plant can be supplied with lorry type body, or an additional equipment can be carried on platform of chassis, enabling two arcs to be supplied. A large number of equipments have been supplied for use in connection with repairs to ships, marine and land boilers.

Up to the present electric arc welding has not been very extensively adopted for manufacturing purposes, but there is no doubt in the course of the next few years electric welding will supersede a large number of manufacturing operations. Its use in the form provided by the mobile arc welding equipment marks a great advance, just as is the case with the use of the Tilling-Stevens vehicles by the Admiralty and the War Office for providing a mobile form of searchlight equipment. This has been operated not only in this country and the near theatres of war, but in the distant operations against the Germans in South-West Africa.

KARRIER 5-TON CHASSIS.

In view of the interest created by the latest product of the Karrier Motor Vehicle Works of Messrs. Clayton and Company, of Huddersfield, we reproduce (page 191) illustrations of the chassis, which is that of the 50-H.P. 5-ton industrial vehicle, type B.R. 110. It embraces many improvements, the most important being three-point engine suspension, improved and more convenient control levers for gear changing, brakes, and throttle and magneto control; more convenient and better brake adjustment, and front and rear springs of improved design.

The B.R. 110 chassis is admirably designed for general heavy haulage, such, for instance, as that of the cotton trade and the textile industries. The high standard of quality and workmanship throughout is worthy of Karrier engineering. The 50-H.P. engine (the largest engine fitted for British War Office specification), and the useful range of speeds, deserve special mention, as being of great service and advantage in hilly country. The load capacity is 5½ tons gross, and assuming the body does not weigh more than half a ton (which is an ample estimate), then the net load can be safely taken as 5 tons—a useful and practical load in the class of work for which this chassis is recommended.

Subjoined are the particulars of the engine and chassis:—

Details of Karrier 4-Cylinder Engine No. B.R. 110.

Horse-power (largest engine fitted for British War Office specification)	50
Bore	5 in.
Stroke	6 in.
Normal speed	1,000 revolutions per minute.
Piston displacement	7,722 cubic centimetres. 471·24 cubic inches.

Dimensions of Chassis.

From starting handle to towing hooks overall	20 ft. 11¼ in.
From dash to rear end of chassis frame	15 ft. 6 in.
From dash to centre of petrol tank	2 ft. 11⅛ in.
From centre of petrol tank to rear end of chassis frame	12 ft. 6⅞ in.
From dash to centre over back axle	11 ft.
From ground to top of chassis frame	2 ft. 10 in.
Back axle overall	6 ft. 10¾ in.
Front axle overall	7 ft. 2½ in.
Diameter of rear wheels (over tires)	3 ft. 4 in.
Diameter of front wheels (over tires)	3 ft.
Tires (rear wheels)	160 × 881 (Twin).
Tires (front wheels)	120 × 720
Wheel track	5 ft. 11 in.
Wheel base	13 ft. 6 in.

For some years the Karrier works have been turning out industrial vehicles of the highest quality and reliability; and to-day Karrier cars are doing yeoman service in every sphere of public and commercial work, as well as in the war areas. War conditions have proved the soundness of the design—strength and efficiency in every detail, phosphor bronze bushing of small parts, roller bearing transmission, accessibility, ample strength and proportion of all bearings, the evidence of careful workmanship in the finish of minor details, the efficiency of the cooling system that prevents overheating, and the flexible engine with power sufficient for its maximum load, and power to spare.

MOTOR TRAFFIC ON BRIDGES.

As the result of a lawsuit, which was carried to the House of Lords, it was decided that railway companies are not liable to adapt their bridges to the requirements of heavy motor traffic. The Association of Municipal Corporations have requested their Law Committee to confer with the County Councils Association and with such other bodies and persons as they deem expedient, and to report what should be done in order that railway and other bridges (the weakness of which at present makes large sections of the highways useless for motor traffic) shall be reconstructed or strengthened in accordance with modern requirements.

MANCHESTER TRANSPORT ORGANISATION.

At the request of the Ministry of Munitions, the Manchester Chamber of Commerce have formed a motor transport organisation at York Street, Manchester, in order to facilitate the speedy despatch of goods and to obtain return loads for motor lorries and steam wagons. The scheme will have the support of and co-operation of the Chambers of Commerce of Leeds, Bradford, Halifax, Huddersfield, Dewsbury, etc.

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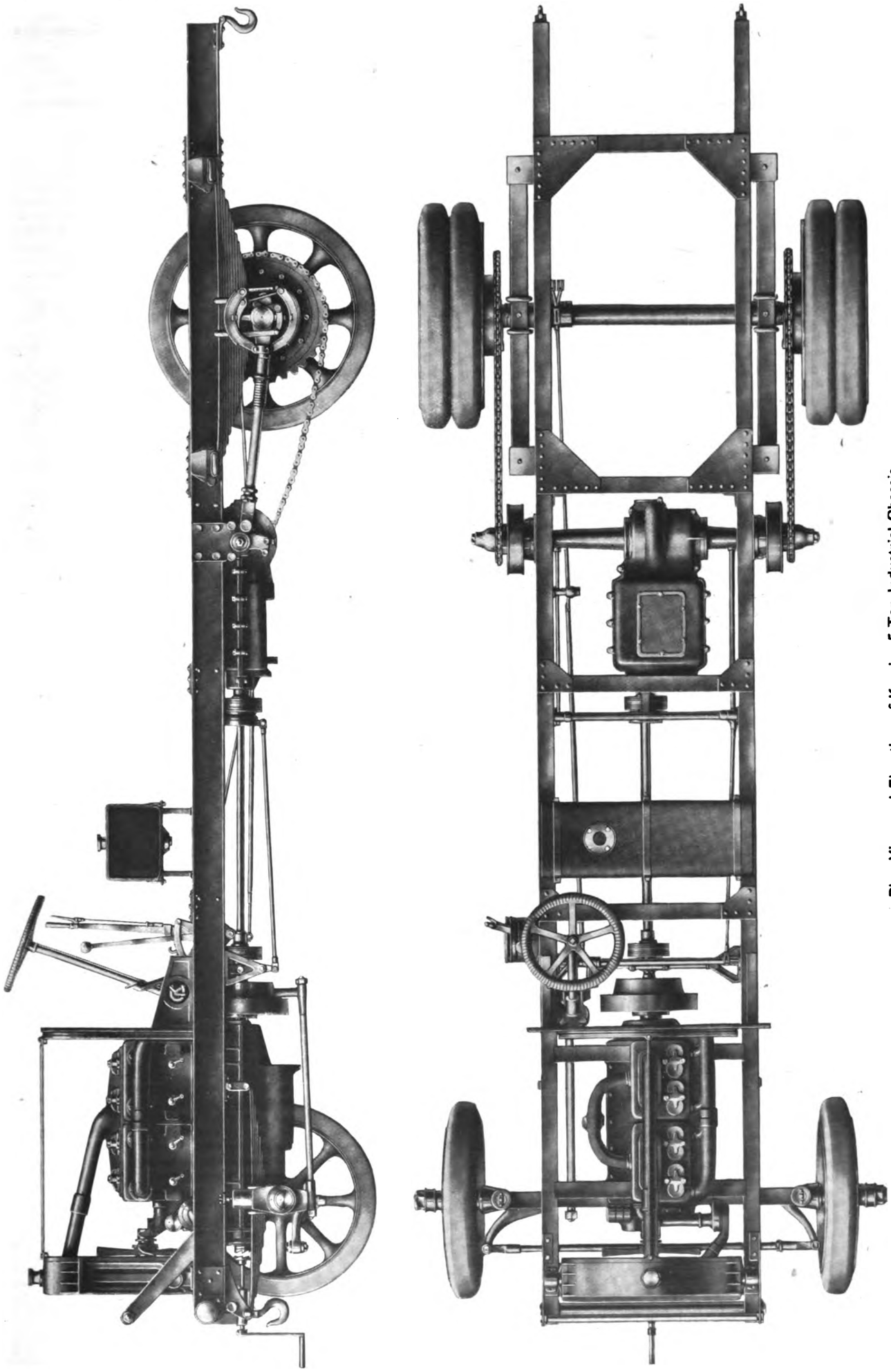

Plan View and Elevation of Karrier 5-Ton Industrial Chassis.

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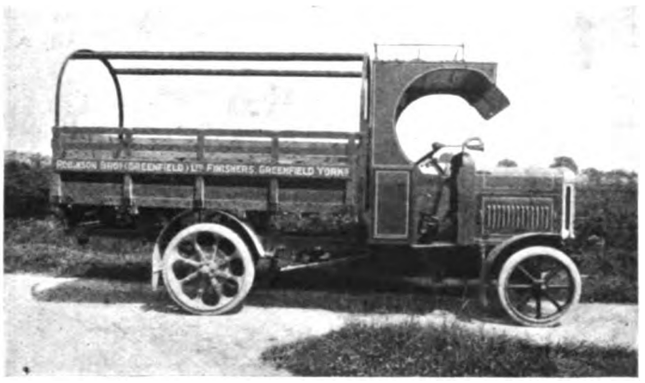
MOTOR TRAFFIC.

THE DEMAND FOR LEYLANDS.

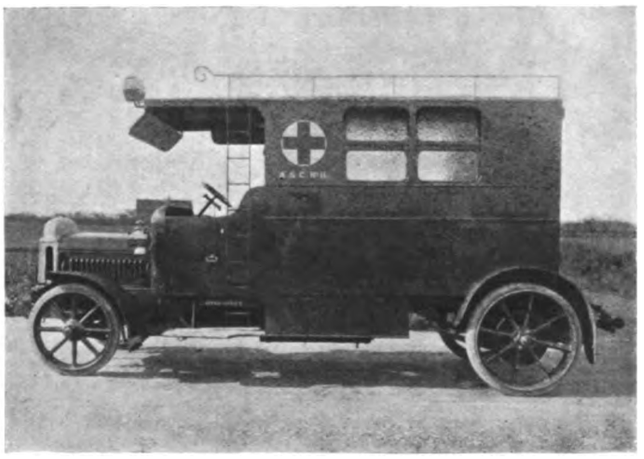
No firm of motor manufacturers has rendered greater service to the Empire during the war than Leyland Motors, Limited, of Leyland, Lancashire. In addition to supplying many hundreds of vehicles for military use in the various theatres of war, their products are largely adopted by firms engaged on munition work and in other spheres of national importance. Leyland Motors, Limited, are also



Leyland "B" Type, War Department Subsidy Model in Service in France.

prominent as manufacturers of motor fire engines, the demand for which has been abnormal during the war, on account of the erection of so many national munition factories and also in order to combat conflagrations that may result from air raids.

A chassis in great demand is that with an engine developing 22-28 H.P., "B" type, with a carrying capacity of 2½ tons. This has long been a popular War Department subsidy model, and one



Leyland Ambulance, "B" Type, War Department.

of the appended illustrations shows a lorry which was in the service of a Yorkshire firm, but was impressed for service in France.

The same horse-power applied to ambulance vehicles of the "B" War Department type has resulted in a conveyance admirably adapted for such important work, even when only solid tires are provided. A very large number of this class is in war use, thus saving the expense of and giving greater reliability than pneumatic tires.

WILTSHIRE COUNTY COUNCIL AND NEW OMNIBUS ROUTES.—The County Council of Wiltshire have decided that all consents given under Section 20 of the Local Government (Emergency Provisions) Act, 1916, to the establishment of new omnibus routes shall be upon condition of a payment of 2d. for every mile travelled.

UNITED KINGDOM PETROLEUM.

THE CROWN TO HAVE EXCLUSIVE RIGHTS.

Mr. Walter Long, the Colonial Secretary, introduced in the Commons on August 18 a Bill, which will no doubt be passed after the recess, giving the Government power to bore for oil within the United Kingdom and develop home supplies which are believed to exist but which cannot be easily located by private enterprise. To leave petroleum to the scramble of competition would result, said Mr. Long, in extravagance and waste as in other countries.

It provides that the Crown shall have the exclusive right of getting petroleum within the United Kingdom, and if any person without a licence gets petroleum he shall forfeit a sum equal to three times the value of any petroleum gotten by him.

There shall be paid into a special fund called the petroleum royalties fund

(a) In respect of petroleum gotten on behalf of His Majesty, out of moneys provided by Parliament; and

(b) In respect of petroleum gotten by a person holding a licence under this Act by the licensee, a sum equal to 9d. for every ton of petroleum so gotten.

Where operations for the getting of petroleum are commenced in any district, the Board of Trade shall prepare a scheme defining the area the persons interested in the land in which are entitled to receive payments. A penalty of three months' imprisonment or a fine of £50, or both, is provided for any person, or, if a company, every director and officer of the company, who refuses to give the necessary information required or gives false information.

The Board of Trade may search and bore for and get petroleum, and may grant licences for such consideration as the Board think fit.

The sum payable into the petroleum royalties fund in respect of natural gas shall be a sum equal to 1d. for every 10,000 cubic feet of the gas computed on the basis of volume at the barometric pressure of 30 inches of mercury and a temperature of 60 deg. Fahrenheit.

FREEDOM FROM ACCIDENT COMPETITION.

At the last meeting of the London Safety First Council, held at the Middlesex Guildhall, Westminster, the Council adopted a recommendation by the Drivers' Educational Committee for the promotion of a Freedom from Accidents Competition upon the following conditions:—

(1) The competition is to be known as the "London 'Safety First' Freedom from Accidents Competition."

(2) The object of the competition is to encourage, by the award of money prizes and badges of merit, drivers of all classes of vehicles to exercise every care and discretion in the performance of their duties.

(3) The competition will be divided into three classes, viz.:—(1) Drivers of motor vehicles; (2) drivers of horsed vehicles; (3) drivers of tramcars.

(4) Thirty prizes of 10s. each, together with a first-class badge of merit, and fifty second-class badges of merit, are offered in each of three classes, to drivers whose records, in the opinion of the council, qualify them to receive such awards.

(5) All drivers continuously employed for the period of twelve months from October 1, 1917, by one or more of the corporations or firms operating in the Greater London area will be eligible to compete in their respective classes, and intending competitors should at once notify their employers of their desire to take part in the competition.

(6) The competition will commence on October 1, 1917, and terminate on September 30, 1918.

(7) Employers must, not later than Tuesday, October 22, 1918, send to the honorary secretaries of the London "Safety First" Council, a duly certified return giving the names and addresses of those of their employees who, during the twelve months ending September 30, 1918, had been free from accidents.

(8) The decision of the London "Safety First" Council on all matters affecting this competition is to be final and binding

On the recommendation of the Publicity Committee it was agreed to make application to the education authorities in the Greater London area for permission to promote a competition among scholars attending elementary schools, and to award prizes for essays on "Safety First" written by school children. The committee also reported having issued a poster dealing with "safety" advice for pedestrians.

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MOTOR TRAFFIC.

AUSTIN CHASSIS WITH TOWER WAGON.

The photograph reproduced on this page illustrates an Austin 2-3 ton chassis, fitted as a tower wagon, which was recently supplied by Mr. H. H. Timberlake, of Wigan, to the Wigan Corporation Tramways Department. The body was specially designed by Mr. Frank Buckley, tramways general manager, and it was built by Messrs. Rawlinson, of Blackburn.

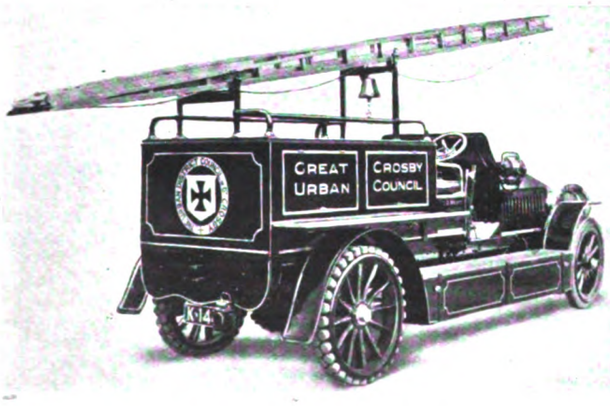
Austin Chassis Fitted as Tower Wagon.

Numerous tramway undertakings have found that one or more motor tower wagons are indispensable, not only in emergencies that arise in the course of tramway traffic but for the transport of materials and for the execution of ordinary overhead and other repairs. The additional security and convenience resulting from the use of a motor tower wagon compensates in a very short time for the outlay incurred.

ADAPTABILITY OF THE NAPIER.

The subjoined photograph shows a transformed old type Napier, adapted as a fire engine vehicle, supplied to the Great Crosby Urban Council by Messrs. D. Napier and Son, Limited, 14, New Burlington Street, W.

The chassis is nine years old, and had been in use as a touring car for that period, giving complete satisfaction. It was then purchased



by Messrs. C. W. Donkin and Company, Limited, Liverpool, stripped, and the present body fitted. It is now being used in the capacity of a fire engine tender.

It is obvious that under war conditions new chassis cannot be supplied for public use, and our illustration shows how an old chassis of reliable make can be adapted to modern requirements. The service which this vehicle has been put to during its nine years of life is certainly a tribute to British workmanship.

MOTOR VEHICLES FOR MUNICIPALITIES.

Widnes Council have purchased a 5-ton motor wagon.

Bingley Council are likely to purchase a steam wagon.

Shrewsbury Council are purchasing a motor fire engine.

Bradford City Council have purchased a motor tractor.

Weymouth Council propose to acquire a battery vehicle.

Kingswood Urban Council have decided to purchase a motor fire engine.

Grimsby Council are purchasing another motor ambulance for the sanatorium.

Bath Corporation have under consideration the purchase of another motor lorry.

Barrow-in-Furness Council are purchasing a motor fire engine and a motor ambulance.

Leeds Tramways Committee are obtaining two steam wagons at a cost not exceeding £1,600.

Littlehampton Council have formed a committee to raise funds for the purchase of a motor ambulance.

West Ham Council are obtaining two motor ambulances, at £650, from Messrs. Wilson and Stockall.

Thornaby Council have instructed the surveyor to obtain tenders for the supply of a motor fire engine.

Darlington Corporation have decided to purchase a motor wagon for use in the Highways Department.

Rochdale Corporation have adopted a report by the Cleansing Committee in favour of obtaining motor vehicles.

Mansfield Council have approved of the purchase of an electric tip wagon from the General Vehicle Company at £1,070.

Birmingham Corporation have granted powers to a private company to operate a number of gas-driven motor omnibuses.

East Ham Council are obtaining information from Sheffield and other municipalities as to their experience with electric dust vans.

Stretford Urban Council have under consideration a report recommending the use of steam wagons for the collection of house refuse.

Southend Corporation have decided to purchase four 2-ton "Orwell" electric tipping wagons, fitted with "Ironclad Oxide" batteries.

Huddersfield Council have failed to secure the sanction of the Local Government Board to acquire electric wagons by means of a loan.

Cambridge Corporation are considering a report from the Fire Brigade Committee recommending the purchase of a motor fire engine.

Johannesburg Council have purchased a motor cycle and side car with electric light outfit for £139, for the use of the electricity department.

Dewsbury Electricity and Tramways Committee have placed a contract with Mossay and Company for a battery propelled wagon, at £911.

York Tramways Committee have received the sanction of the Treasury to borrow £1,300 for the provision of another battery propelled omnibus.

Halifax Corporation have given instructions to the borough surveyor to make inquiries with a view to the purchase of a second-hand tipping wagon.

Consett Urban Council have decided to fit up a petrol van, used for the collection of house refuse, with coal gas equipment for experimental purposes.

Marylebone Council have ordered four additional motor vans, for dust conveyance, from the Austin Motor Company, at an estimated cost of £745 each.

Kettering Urban Council have received a 3½-ton battery tipping wagon from the General Vehicle Company. It is to be used for the conveyance of coal.

Salford Corporation have approved of the recommendation of the Gas Committee for the purchase of a motor wagon for distributing coal to householders.

Salford Electricity Committee has accepted Messrs. Mann's Patent Steam Cart and Wagon Company's tender for the supply of a 5-ton tipping wagon at a cost of £850.

Okehampton Rural Council are inquiring as to the possibility of purchasing a motor lorry for the haulage of stone, owing to the difficulty experienced in hiring horses and men.

Walthamstow Urban Council have decided to purchase a 5-ton steam wagon for use in the Highways Department, replacing the 5-ton Clayton wagon taken by the Government.

Bath Corporation have instructed the electrical engineer to make inquiries with a view to the purchase of a motor lorry for taking away clinker and bringing coal from the colliery.

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MOTOR TRAFFIC.

PORTSMOUTH COUNCIL have been informed by Foden's, Limited, that Government priority work will prevent them from delivering the two Foden steam vehicles now on order until December next.

ESSEX COUNTY COUNCIL have bought a second-hand 5-ton steam wagon, by Messrs. Clayton and Shuttleworth, from the Midland Rolling and Haulage Company, for the sum of £440, and a second-hand Aveling and Porter steam wagon at £400.

MANCHESTER CITY COUNCIL have sanctioned the purchase of motor vehicles as appended :—Tramways Committee, an additional parcels van from the Frances Motors, Limited ; Fire Brigade Committee, motor fire engine and escape and motor fire engine ; Baths and Washhouses Committee, Ford motor van for the conveyance of towels.

DEWSBURY GUARDIANS, desiring to purchase a motor vehicle for conveying patients to asylums and the sick poor to the Infirmary, asked the Local Government Board to sanction the purchase. In reply the Board stated that it was advisable to defer the proposal in view of the petrol difficulty. The Guardians, however, instructed their committee to continue their inquiries, and it was remarked that the time was opportune for purchasing one of the many private cars now standing idle

MOTOR TRAFFIC NOTES.

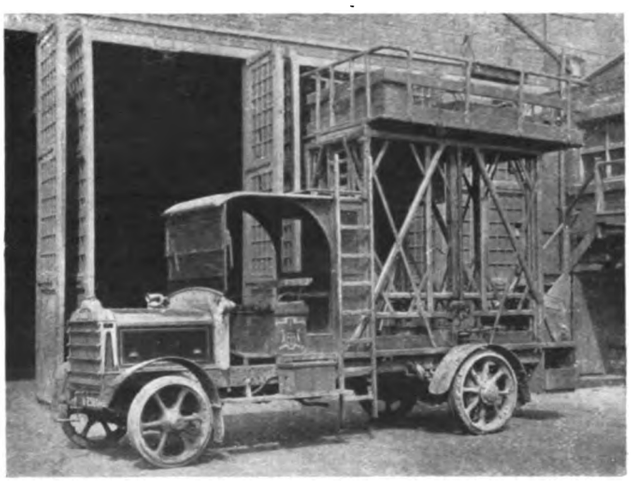
COAL GAS FOR CABS.—Early in August a motor cab propelled by coal gas was plying for hire in London.

THE FORD MOTOR COMPANY have presented one thousand motor ambulances to the American Red Cross Society.

PUBLIC TRACTION POWERS FOR LONDONDERRY.—The Corporation of Londonderry have decided to apply for powers to provide and work electric trolley vehicles, motor omnibuses, or electric cars.

LONDON MOTOR AMBULANCE SERVICE.—Since the institution in February, 1915, of the ambulance service of the London County Council, 11,649 calls have been attended to up to the end of the year 1916. In the first year the calls numbered 2,405, and in the second year 9,244. There are six stations and nine motor ambulances, including two spare vehicles.

SUGGESTED BY-LAWS FOR OMNIBUS TRAFFIC.—Sir W. Ryland Adkins, M.P., suggested, at a meeting of Northamptonshire County Council, that the Roads Committee should consider the question of framing by-laws for motor omnibus traffic. He asserted that some of the vehicles were overloaded, and were consequently dangerous, particularly in certain parts of the county where the roads were uneven.



A Daimler Tower Wagon—Leeds City Tramways.

A JAPANESE OMNIBUS SCHEME.—According to a report in the local newspapers forwarded from Tokio by H.M. Commissioner, application has been made to the city authority for sanction to a project for running 200 motor omnibuses. It is proposed that the vehicles shall be of small size owing to the narrowness of the streets, accommodation being provided for twenty passengers per omnibus. A company has also been formed with a capital of £51,000 for the conveyance of passengers by motor cars, and for selling and repairing cars.

WAR TRAFFIC AND ROAD WEAR.—Marylebone Council suggested to the quarterly meeting of the Metropolitan Boroughs Standing Joint Committee that they should make representations with a view to securing grants to local authorities by the Road Board for the purpose of repairing or relaying roads damaged by the abnormally heavy traffic of military and other vehicles due to the war. It was suggested that the grants should be made as soon as convenient after the cessation of hostilities. The matter was referred to the executive committee.

45-h.p. 5-Ton Halley Lorry Supplied for Munition Work to a Glasgow Firm.

NO COMPENSATION FOR IMPRESSED OMNIBUSES.—West Bridgford Urban Council have been informed by the Losses Commission that having regard to the terms of the warrant by virtue of which they acted, the Commission are unable to determine that any sums should be paid out of public funds in respect of the Council's claims for the impressment of their motor omnibuses early in the war. Acting on the advice of counsel, Mr. E. G. Palmer, the local authority have decided to proceed by mandamus to compel the Commissioners to make a report dealing with the case on its merits.

ELECTRIC VEHICLES.—The success of the electric vehicle in the municipal field has been largely due to its low running costs. For town work, where frequent stoppages are required, accumulator cars have been found to be thoroughly suitable, and the rapid development of this form of traction can be looked for just so soon as the Government control of labour and materials will permit. The recent increase in the price of petrol lends point to the suggestion of Messrs. Alan S. King and Company, of 28, Victoria Street, Westminster, in their advertisement in this issue, that motor users should be independent of petrol by the use of electric vehicles. Messrs. King are, we understand, in a position to supply electric vehicles to approved clients with quick delivery.

SOLID TIRE COMMITTEE.—Mr. F. A. Bonsor, of the Avon India-rubber Company, Limited, has been elected chairman of the Solid Tire Committee of the Society of Motor Manufacturers and Traders. The vacancy was caused by the retirement of Mr. W. H. Paull, of the Dunlop Rubber Company. Mr. Paull's long record of service has been recognised by the passing of a vote of thanks by the committee. Mr. Paull was one of the representatives of tire makers who recently visited France and presented a report to the War Office relative to tires.

LIEUT. F. ST. JOHN WHITE.—Although still suffering severely from the effects of the disablement which necessitated his being invalided from the service, it is gratifying to note that Lieut. Frederick St. John White, the Lacre Motor Car Company's publicity manager, is making a steady if somewhat slow recovery. His two years of active service do not, however, appear to have impaired his skill, and since he received his present appointment in January last he has introduced a new atmosphere of vigour and originality into the company's advertising. Mr. White has been closely associated with publicity work for the past twelve years, during which he has dealt with a variety of difficult advertising problems with notable success. He has for some years past been closely identified with railway and shipping circles, in which his journalistic abilities have been shown in the production of illustrated guide books and other travel literature. He served with the Queen's Royal West Surrey Regiment since the outbreak of war, being subsequently transferred to the Royal Fusiliers, and invalided last year with the permanent rank of Hon. Lieutenant.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

ROYAL BURGH OF KIRKCALDY.

Electricity and Tramways Department.

The Corporation are prepared to receive tenders for the supply, delivery and erection of Converting Plant and Switchgear.

Form of tender and specification may be obtained by *bona fide* contractors from O. F. Francis, M.I.E.E., Burgh Electrical Engineer, Electricity Works, Kirkcaldy.

Sealed tenders endorsed "Tender for Converting Plant" must be delivered to the undersigned not later than Tuesday, October 2, 1917.

The Corporation do not bind themselves to accept the lowest or any offer.

Kirkcaldy. WM. L. MACINDOE,
11th September, 1917. Town Clerk.

CORPORATION OF DUBLIN.

Electricity Supply Committee.

Tenders for Economiser.

The Electricity Supply Committee of the Corporation of Dublin invite Tenders for the supply and installation, at their Pigeon House Fort Generating Station, of one Green's Economiser.

General Conditions, Specification, and Form of Tenders may be obtained from the City Electrical Engineer, Dublin, on and after Thursday, September 13, on payment of one guinea, which sum will be refunded on receipt of a *bona fide* tender.

Tenders, sealed and endorsed "Tender for Economiser," should be addressed to "The Chairman, Electricity Supply Committee, Lord Edward Street, Dublin," and delivered there not later than 12 o'clock noon on Wednesday, September 19.

The Committee do not bind themselves to accept the lowest or any tender.

FRED. J. ALLEN.
Lord Edward Street, Dublin, Secretary.
September 10, 1917.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive Tenders for the supply of the following Stores, namely:—

Grindstones.
Miscellaneou sArticles.
Antimony.
Spark Arresters.

Specifications anc Forms of Tender may be obtained at this office on payment o. the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Grindstones," or as the case may be, not later than 11 o'clock a.m. on Thursday, September 20, 1917.

The Directors do not bind themselves to accept the lowest or any Tender.

R. H. WALPOLE,
Company's Offices, Secretary.
48, Copthall-avenue, E.C.,
London, September 7, 1917.

CITY OF BELFAST.

Tramways Department.

Supply of Uniform Clothing.

The Tramways and Electricity Committee are prepared to accept tenders for the supply of the following Uniform Clothing:—

625 Motormen's Suits.
350 Conductors' Suits.
350 Conductors' Overcoats.
350 Motormen's Overcoats.

Samples of the clothing can be seen any day except Saturday, between 9 a.m. and 5 p.m., on application to the General Manager at the Tramway Offices, Sandy Row, Belfast.

The Committee do not bind themselves to accept the lowest or any tender.

Tenders must be enclosed in an envelope duly sealed and addressed to the undersigned, endorsed "Tender for Uniform Clothing, Tramways Department," and must be delivered at the City Hall, Belfast, not later than 11 a.m. on Saturday, the 22nd September, 1917.

City Hall, Belfast, R. MEYER,
11th September, 1917. Town Clerk.

CORPORATION OF BURY.

Supply of Winter Coats.

The Corporation of Bury invite Tenders for the supply of 70/80 Winter Coats for Female Conductors.

Forms of Tender may be obtained, and sample inspected, on application to the General Manager, Central Tramway Office, Market Place, Bury.

Tenders to be delivered to the Town Clerk, Bury, not later than 10 a.m., on Monday, October 1st, 1917.

Municipal Offices, Bank Street, Bury,
11th September, 1917.

POSITIONS VACANT.

CHESTERFIELD CORPORATION ELECTRICITY DEPARTMENT.

Appointment of Chief Engineer.

The Corporation of Chesterfield is prepared to receive applications for the appointment of Chief Assistant Engineer to the Electricity Department.

The salary will commence at £230 per annum, increasing annually by £10 to £250 per annum.

Applications to be delivered to The Engineer, Electricity Works, Chesterfield, not later than the first post on Monday, October 1.

Forms of application to be obtained from—

THE ENGINEER,
Electricity Works,
Chesterfield.

THE BOROUGH OF RAWTENSTALL.

Car Shed Superintendent.

Applications are invited for the position of Car Shed Superintendent.

Applicants must have had experience in a Tram Depôt, and have a knowledge of all trades employed and a thorough experience in the management of men. Permanent position for suitable man. Applications, giving full particulars of experience and qualifications, enclosing copies of testimonials, and stating salary required, to be sent to the undersigned not later than Wednesday, the 19th September, 1917. C. L. E. STEWART,
General Manager.

OVERHEAD LINESMAN.

Wanted (Corporation light railways) Overhead Linesman, taking charge six miles of line, capable of running new trolley wire, guard wire, and attending to breakdowns; wages £2 per week, with 2s. 6d. war bonus.—Apply, T. G. RICHARDSON, General Manager, Corporation Tramways, Keithley Road, Colne, Lancs.

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SAND OR DIE—2 h.p. to 600 h.p.

ROBERT W. COAN,

Telegrams: KRANKASES, ISLING, LONDON. | 219, GOSWELL RD., LONDON, E.C. | Telephones: 3846 CITY. 4879 CENTRAL.

TRAMWAY SUPPLIES, Ltd.

Tramway Engineers,

Sole Selling Agents for S. Dixon & Sons' Tramway Material,

160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of

TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

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When you want High Quality

High Speed and Carbon
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Centre Drills
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Slitting Saws
Band Saws (Wood or Metal);

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110, Cannon Street, London, E.C.4.

'Phone: City 3456-7.

73, Lichfield St., Wolverhampton. 'Phone: 630 Wolverhampton.

Sole Sales Representatives for the Celebrated "FASTNUT" WASHERS. Over Two Millions used annually by the L.G.O. Co Write for free samples.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

(NATURAL, GLAZE, DULL FINISH, OR COLOURED)
in twill, straight, or fancy weaves, canvas backed or unbacked, is

BRITISH MADE THROUGHOUT

from the splitting of the cane to the finished article.

We hold **LARGE STOCKS OF RAW MATERIALS** and can

GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY, LTD.

13, CITY ROAD, LONDON, E.C.

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE. NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, SEPTEMBER 15, 1917.

THE DAY OF THE ELECTRIC VEHICLE.

The day of the electric vehicle forcertain commercial and industrial purposes has arrived, subject only to one condition, though an important one. The condition is that the Government will grant licences for the importation of such vehicles into this country, and also provide such facilities as are necessary to allow them to be manufactured in Great Britain. The day has arrived for more than one reason, but the predominant cause is the recent enormous increase in the price of petrol. Even before the war, when petrol was at normal prices, it was found that for certain purposes the storage battery van or wagon could hold its own with the petrol-driven vehicle. That had been amply demonstrated in the United States, but in this country the number of electric vehicles was limited. Still, the users of them were so high in their praise that the numbers increased as far as manufacturing facilities allowed. In order that labour, materials, and shipping should be conserved for purposes ancillary to the war, home production and the importation of electric vehicles were at length banned by the Government. Steel and other materials are not to be got except on Government certificate, which is only granted if they are to be used for work "of national importance." Then came the increasing scarcity and price of petrol, culminating in the recent huge advance in the cost of that article. For many purposes that cost is now practically prohibitive. However successful the attempts to substitute coal-gas for petrol, they will not materially lessen the demand for electric vehicles; for in many cases the application of the coal-gas is not feasible, and there is the growing necessity for an increase in the number of motor-driven road wagons. Railway services for the local conveyance of goods are uncertain and costly, and trade is hampered at every turn. There can be no doubt that if electric vehicles could readily be obtained, thousands would speedily be running. The increase in the price of coal has not been of such an amount as very greatly to enhance the cost of electrical energy. It still remains at such a price that the use of electricity for traction is more economical than petrol. Especially for town and suburban work the "electric" possesses, in any case, inherent advantages. What it can do is indicated in a report on the working of a tip-wagon at Southampton which is given in this issue. In many other towns it has proved its value in the forms of municipal dust vans, wagons and lorries for the conveyance of goods, parcel delivery vans, and so forth. Nowhere does it show to greater advantage than in services which involve very frequent stoppages. Smoothness and ease in stopping and starting are very conspicuous. There is also the advantage of simplicity of control—an important point in these days when skilled motor drivers are so scarce. Anyone, man or woman, can be taught in a very short time to drive an electric vehicle. Only one thing is needed, and that is that the Government should recognise the crying need for the multiplication of such vehicles. If the authorities realise the fact that such multiplication will not add one pint to the consumption of petrol, so greatly needed for army purposes, they ought not to hesitate to modify the restrictions on the manufacture and importation of electric vehicles.

LONDON "SAFETY FIRST" COUNCIL.

"FREEDOM FROM ACCIDENTS" COMPETITION.

With the object of reducing the number of traffic accidents which occur annually in the Greater London area, the London "Safety First" Council are inviting the drivers of all classes of vehicles to qualify for the above competition. The following are the conditions:—

1. The competition is to be known as the "London 'Safety First' Freedom from Accidents Competition."
2. The object of the competition is to encourage, by the award of money prizes and badges of merit, drivers of all classes of vehicles to exercise every care and discretion in the performance of their duties.
3. The competition will be divided into three classes, viz., for:—
   1. Drivers of motor vehicles.
   2. Drivers of horsed vehicles.
   3. Drivers of tramcars.
4. Thirty prizes of 10s. each, together with a first-class badge of merit, and 50 second-class badges of merit are offered in each of the three classes, to drivers whose records, in the opinion of the Council, qualify them to receive such awards.
5. All drivers continuously employed during the period of twelve months from October 1, 1917, by one or more of the corporations or firms operating in the Greater London area, will be eligible to compete in their respective classes, and intending competitors should at once notify their employers of their desire to take part in the competition.
6. The competition will commence on October 1, 1917, and terminate on September 30, 1918.
7. Employers must, not later than Tuesday, October 22, 1918, send to the honorary secretaries of the London "Safety First" Council, a duly certified return giving the names and addresses of those of their employees who, during the twelve months ended September 30, 1918, had been free from accidents.
8. The decision of the London "Safety First" Council on all matters affecting this competition is to be final and binding.

The co-operation and assistance of all employers are earnestly solicited.

Communications respecting the competition should be addressed to the Honorary Secretaries, the London "Safety First" Council, 31, Westminster Broadway, S.W.1.

MANCHESTER TRAFFIC PROBLEM.

The report of the Traffic Congestion Special Committee of Manchester Corporation came before the September meeting of the City Council. Alderman Wilson, chairman of the committee, submitted the following resolution:—"That the Council, without committing itself to the details of the various schemes embodied, approves the general principles set forth in the report now submitted." (A summary of the recommendations embodied in the report was published in our issue of September 1.) The Chairman remarked that by passing the resolution, the Council would not be committed to any scheme, for, as stated at the end of the report, "before any part is presented to the Council for approval full particulars and the estimated cost will be submitted by the committees concerned." Something, however, must be done at the earliest opportunity to relieve the traffic in the centre of the city. He had only to say that thirteen million more passengers were carried by the Manchester tramcars last year than in the year preceding to show how needful it was to provide new outlets for

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tramway traffic. The effect of the proposed new tram terminals and arterial routes would be to relieve traffic in the city centre by 50 per cent., and he thought the provision of the terminals would be the first thing that the Council would be asked to sanction. If tramcar traffic increased in future as in the past the cars would be carrying in 1932 not less than 386,000,000 people every year. Excluding the terminals, the cost of the scheme would probably be £1,500,000. He admitted the superior mobility of motor omnibuses, but said that four omnibuses would be required to do the work of one tramcar. As 600 cars were in use, Manchester would need four times that number of omnibuses if they gave up the cars. Omnibuses would be useful in linking up outside places and various terminals with other parts of the tramway system. The difficulties as to the use of the old infirmary site had been overcome, and it was proposed to place the tramway behind any building that might be erected on the site. By that method the city would be given a noble building, a tram terminus, and an open space. An amendment to adjourn the debate for a month was rejected, and the resolution was then agreed to.

SOUTHAMPTON'S ELECTRIC TIP WAGON.

About a year ago, on the advice of Mr. W. T. Robson, general manager and engineer of Southampton Corporation Tramways, a two-ton Edison tip wagon was purchased, and Mr. Robson has now presented a detailed report of the work of this vehicle for the first twelve months, which shows that the vehicle has proved a success in every way. An accurate record has been kept, by means of weekly cost sheets, which gives the following totals :—

	£	s.	d.
Stores (including canopy and wind-screen)	9	10	0
Wages	95	0	0
Electricity	53	4	1
Cleaning and maintenance	8	10	0
Tires	25	0	0
Insurance	7	4	0
Spare parts (including new chains)	7	11	9
Depreciation (10 years' life)	95	0	0
	£300	19	10
Deductions :—			
Income from other departments	153	17	11
Saving effected on contracts	34	8	4
Net cost of year's working	£112	13	7

The total weight of material carted amounted to 2,500 tons, including 1,300 tons of general tramway carting and 1,200 tons carting for other departments. As no records were kept of the work previously done by horses, the exact weight cannot be given, but it must have been considerably less, as it was always found necessary to engage additional horsing whenever scrap was carted away or reconstruction work was in progress. This additional expense should, of course, be added to the ordinary horsing cost, which for the twelve months before the tip wagon was purchased amounted to £412 10s. 6d. Deducting the income from hire to works department and from the sale of manure, £135 11s. 7d., the net cost of the year's working stands at £276 18s. 11d.

These figures, although showing a saving of over £164, do not, Mr. Robson adds, by any means denote the entire usefulness of this vehicle, which has taken the place of one of the tower wagon horses in towing a second tower wagon nearly every Sunday, in saving the cost of a large gang of men when moving rails, and by means of its extraordinary capacity for work has rendered unnecessary the need for additional horsing from outside. It has averaged nearly eight hours' work per day, has never been out of commission, and has given no trouble whatever.

The battery, which is the most expensive feature, has required no attention except to keep externally clean and for occasional filling up with distilled water, both operations taking only one hour per week. During the forthcoming year the liquid will probably require renewal at a cost of approximately £8, but otherwise Mr. Robson does not anticipate any further expense than is shown in the first year's costs.

Wages at Sheffield.—The Tramways Committee has recommended that from August 20 an additional war allowance of 3s. per week to male employees and 2s. per week to female employees in the tramways department be granted to all such employees as are in receipt of wages of less than 56s. per week, with the exception of those employees in the engineering trades who recently received the allowance under the award of the Committee on Production.

Short Strike at Wallasey.—The Wallasey Tramways Committee disagreed recently as to the advisability of employing women as drivers, and the Council gave a direct instruction that a few women should be trained and employed experimentally. When the manager attempted to carry out the instruction, a strike was threatened. It was pointed out to the men that the strike would be illegal under the Munitions of War Act, twenty-one days' notice being necessary to the Board of Trade, and even then if there was official intervention it would not be allowable for the men to carry out their threat. Colonel R. R. Greene, the tramways manager, attended a meeting of the employees, and explained that the resolution of the Council would have to be carried into effect, but though a few women were being trained, there was no intention of displacing men by the employment of woman labour. The employees nevertheless came out on strike on Wednesday, but returned to work on the following day on the understanding that the committee would give immediate attention to their grievances.

FARE QUESTIONS.

In the Newcastle tramcars the appended notice has been posted:—"Children Fares.—Half-fares are chargeable for children under 12 years of age, or under 15 years of age when going to or from school. Children under 5 years of age travel free, but where there are two or more children under five years of age only one is allowed to travel free."

Birkenhead Council have rejected a motion by Alderman Byrne for the rescission of the recent increase of fares on the tramways and to institute penny return tickets for the halfpenny stages now abolished. Councillor Halsall, chairman of the Tramways Committee, mentioned that since the abolition of halfpenny and three-halfpenny fares, the receipts had been the highest on record. Many towns had increased their fares, and others were applying for power to charge beyond the statutory limit of one penny per mile. The charges in Birkenhead were nothing near a penny a mile, and with regard to the halfpenny fares, if they lost them all it would only be equal to 1 per cent. of the total receipts. The committee had to face heavy expenditure, which would increase as they went on.

Two months ago, Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, recommended that the Tramways Committee should consider the question of increasing the fares, in consequence of the continued rise in operating costs and the demand of the Finance Committee that tramways should continue to make the same grant in relief of the rates. At the Council's September meeting, Alderman Bowes, chairman of the Tramways Committee, said that the report as to the allocation of trading profits was crippling the tramways department, and he wished to know from the chairman of the Finance Committee when that report might be expected. The committee were anxious to consider the question of increased fares. The Lord Mayor explained that a special committee was appointed to consider the question of trading profits, and they could not present the report until they received certain information, which they hoped to get before long.

A telling reply to some criticism of the Belfast tramway administration was made at the September meeting of the Corporation by Alderman Tyrrell, chairman of the Tramways Committee. While he invited criticism of the Committee, he thought that some of the criticism of the management was unworthy of the corporation. The new fares and stages were doing more than they hoped for, and he deprecated carping criticism for the purpose of worrying officials. Councillor Atkinson remarked that the increase of revenue upon which Mr. Moffet staked his reputation had been realised, and it was not his fault that there was still a deficit in the year's accounts. The baiting of officials had become too prevalent. Commenting upon the discussion, the *Belfast Evening Telegraph* says: "We believe that if Mr. Moffet gets a fair chance he will make the undertaking pay. He has a strong chairman, he is a strong man himself, and with the co-operation of the committee we may speedily look for a better future for the tramway service than some members of the Corporation think possible."

MISCELLANEOUS NEWS AND NOTES.

Torquay Town Council have called for a report from a committee on the subject of an increase of fares which has been put into force by the tramway company.

Restoration of Normal Time.—The Home Secretary gives notice that summer time will cease and normal time will be restored at 3 a.m. (summer time) in the morning of Monday next, September 17, when the clock will be put back to 2 a.m.

Oil Fuel Restrictions.—The Minister of Munitions has announced that all dealings in crude benzol, crude naphtha or other light oils can only be undertaken under licence from the Director of Raw Material Supplies, the Ministry of Munitions, Storey's Gate, Westminster, S.W.1.

A Scottish Coal Crisis.—In the beginning of this week the Scottish colliery enginemen issued notices for the stoppage of work within 14 days unless they get a war bonus of 1s. per shift. If a strike takes place, the whole coal mining industry of Scotland will be thrown idle.

Gas Fuel for Omnibuses.—In view of the shortage and high price of petrol, Bristol Tramways Company have decided to adopt coal gas as motive power for their omnibuses on the Avonmouth route. Some trees overhanging the road will have to be lopped owing to the increased over-all height of the omnibuses.

The Rule of the Footpath.—The Dundee Tramways Committee have decided to support the Glasgow movement in favour of a change in the rule of the footpath requiring pedestrians to "keep to the left." Mr. Fisher, the tramways manager, stated that the present rule of "keep to the right" had resulted in numerous accidents.

Gas-propelled Vehicles.—Manchester Gas Committee have made arrangements to supply gas to passenger and commercial motor vehicles. A company is being formed for the manufacture of flexible gas holders, and fitting them to vehicles. At Blackpool there is an increasing number of chars-à-bancs and business cars equipped for propulsion by gas.

What is Wilful Damage?—This question was argued at Brentford Police Court on August 30 in connection with the breaking of a tramcar window. A man was summoned for wilfully damaging a window of a car at Hanwell. It was stated in evidence that there was a fight in the car, and that the accused struck another man with such violence that his head went through the window. The Court found that there was no intent to break the window, and dismissed the charge.

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Running Down a Tramcar.—At Cardiff a fine of 40s. was inflicted on a mororist for negligently driving a motor car. It was alleged that he drove past a stationary tramcar without waiting to see whether anyone got off, and a man was knocked down, receiving injuries which necessitated his removal to the infirmary.

Dover Corporation Tramway Service is to be reduced owing to the difficulty of obtaining drivers. Following the recent accident the Committee have approved a recommendation of the coroner's jury to license tramway cars and drivers, and give to the police power to prevent overcrowding.

Wheel Alignment Gauges.—The Dunlop Rubber Company still have a limited number of wheel alignment gauges, which are valuable for reducing tyre maintenance costs. Every car owner should examine the wheels of his car periodically, and the Dunlop alignment gauge will show if the wheels are adjusted with that mechanical precision without which the life of the tyres is certain to be curtailed.

Motorman's Dangerous Practice.—It was stated at an inquest held on the body of a motorman at Manchester that while his car was stationary he sat on the collision fender. The result was that he was badly crushed against a car in front of him owing to a third car colliding with his own vehicle, the driver being unable to pull up. An official of the Tramways Department stated that the deceased had no right to sit on the fender.

Municipal Tramways Association.—The annual conference opens at Blackpool on Thursday at 11 a.m. Delegates have been appointed by more than sixty tramway committees, and a good attendance is expected. The papers and discussions deal with topics of moment to the industry, and the time is likely to be all too short for a full discussion on some of the questions on which a large number of members wish to speak.

Car Derailed at Aberdeen.—A car on the Aberdeen Corporation tramways narrowly escaped disaster on September 9. It was proceeding down a gradient in Bridge Street when the driver appears to have lost control, with the result that the car ran off the rails at the sharp curve at the bottom of the street. Fortunately, it was stopped at the edge of the pavement and was returned to the rails undamaged. The passengers were much alarmed, but no one was injured.

Middlesbrough Tramways.—The Middlesbrough Independent Labour Party have protested against what they describe as the unwarrantable increase of 50 per cent. in the fares imposed on September 1 by the Imperial Tramways Company, and have called upon the Hackney Carriage Committee of the Corporation to insist upon the company withdrawing the new charge. The resolution concluded with an expression of opinion that it is imperative that the tramway service at Teeside should be municipalised.

Women Tramway Workers in Glasgow.—The latest figures issued as to the employment of women by Glasgow Corporation Tramways show that out of a total of about 5,600 employees, 2,500 are women. Of these, 1,360 are conductresses and 400 are drivers. In the power station there are five female switchboard attendants. Eight women are employed in a like capacity in sub-stations, one sub-station being entirely staffed by women. Six inspectors of street switch-boxes are women, while in the depôts there are 490 female cleaners.

Dearer Coal under the Control Order.—It was reported to Grimsby Electricity Committee on September 11 that the Coal Control Transport Order had automatically terminated the Committee's contract for supplies of Sherwood slack at 12s. per ton, as Sherwood was beyond the local area. The committee had no option but to recommend that supplies of Yorkshire slack be obtained at 18s. 6d. per ton. The Engineer (Mr. A. S. Channon) remarked that the coal would be of better quality, and he was hoping that reduced consumption would result in consequence.

Interurban Holiday Traffic.—There have been numerous examples during the holiday season now closing of enormous interurban traffic on the extensive tramway systems in West Yorkshire and Lancashire. The demands on the tramways were intensified by the increased railway fares now ruling. A recent example is afforded by the Huddersfield district, where, last week, during the local holidays, immense numbers of people made use of the tramways to Elland, West Vale, and Halifax. On some routes it was found necessary to double the service.

Season Tickets in Edinburgh.—A meeting of tramway season ticket holders has been held in Edinburgh when a protest was made against the action of the Edinburgh and District Tramways Company increasing the charge for season tickets on the Portobello route from £3 10s. to £5. It was agreed that a deputation should wait on the directors of the tramway company and request that the season tickets for the whole journey should be issued at £4 each and for the half journey at £2 10s., and that a reduction of 10 per cent. should be made in the case of second and subsequent tickets purchased by one family.

Roads after the War.—The seventh annual report of the Road Board, of which Sir George Gibb is chairman, was published on Thursday as a blue book. It states that during the year ended March 31 last applications were received for £1,051,905, of which £996,510 or 91·88 per cent. was for improvements of road crusts. The income of the Board for the past year fell to £152,902, nothing being received from motor spirit duties or carriage licences, and the net payments were £254,568. The Board says that the urgent need at present is the reconstruction of roads too weak to carry modern traffic. About 15,000 miles of roads in England and Wales stand in need of reconstruction, the total cost of which may be estimated approximately as £30,000,000 above the normal expenditure of the local authorities.

Fatalities that might be Avoided.—A young woman who had alighted from a St. Annes tramcar was knocked down and fatally injured by a car coming from Blackpool while she was crossing the road. Doubtless the cars in the district contain a notice directing attention to the importance of passengers seeing that the road is clear before they attempt to cross behind a car, but the accidents due to this cause in all parts of the country lend weight to the need for a "Safety First" campaign.

A Strike in Rossendale.—About 100 employees of the Rawtenstall Corporation Tramways Department struck work on Sept. 2 to enforce a demand that women and boys, like the men, should be paid a war bonus of 4s. per week, to date from July 1. The offer of the Corporation to women and youths was 2s. 6d. a week. The stoppage of the tramway service affected Bacup and neighbouring places, and special inconvenience was caused on Sept. 3, which was a Rossendale holiday. On Sept. 5 the strikers agreed to return to work on the understanding that their application would be considered by the Corporation.

Newcastle's Transportation of War Workers.—In discussing complaints concerning the car services to Gosforth and Jesmond, the Newcastle Trades Council commented on the fact that Gosforth refused the Newcastle Corporation running powers when the tramways were municipalised, but granted them to the Tyneside Company. Mr. Tate mentioned, in regard to the Gosforth and Osborne Road routes, that cars were taken off for the benefit of workmen. On all routes the cars went to serve the workmen before the classes. Mr. Hatton, the manager, had the sympathy of them all, because with a shortage of men and material he had a difficult job to perform at the present time. The Council decided to offer suggestions for possible additions to the workmen's service on the two routes.

Good Tire Mileage Figures.—Some instructive figures of how good mileage can be run up are provided by an examination of the mileage returns supplied to the solid rubber tire manufacturers. Five successive cards recently posted to Messrs. George Spencer, Moulton and Company, Ltd., show that the Alldays wagon of Messrs. Coleman and Robinson, of Rishton, near Blackburn, covered 2,007 miles in five weeks (27 actual running days equal) or an average of just over 400 a week. The firm speak highly of their Spencer-Moulton tires. The same wagon has during this summer often covered between 300 and 400 miles a week, so that the reference to 2,000 miles in five weeks is not a very isolated illustration of long-distance consistent travelling. We are informed that many other firms are running up big mileages on Spencer-Moulton tires, which are evidently justifying their title of "superb mileage tires." They are, moreover, all British.

Employment of Ex-Soldiers.—At a meeting of Oldham Tramways Committee, Mr. Priestley, the manager, reported that the employment of discharged soldiers on the tramways was not having satisfactory results. He said that they did not seem prepared to take the responsibility attaching to the work. Many of them flatly refused to work a full week, on the ground that if they did so their pensions would be stopped. The men were taken on because the staff was so seriously reduced. Soldiers seemed to come back from the Army with the idea that there was a place open for them wherever they liked to go. Some of them were not in good health, and that also interfered with their work. The men, however, of whom he conplained seemed to be physically fit, but apparently they only wanted to draw sufficient money to keep themselves going along with their pensions. They wanted, in fact, to do as they liked. Several members of the Committee expressed regret at the state of matters disclosed.

Magneto Cables.—A very considerable, indeed the most important, part of the business conducted by Messrs. E. Kalker & Co., of Coventry—who have made a speciality of all types of cables and flexibles for the motor trade generally since the first cars were made in this country—is centred in the special cables they supply for aero engines, made up to the specifications of the Aeronautical Inspection Department. These cables, particularly their 111a special magneto cable, are of such a uniformly high quality that not an inch has ever been rejected by the Government inspectors out of the many hundreds of miles Messrs. Kalker are constantly supplying for this class of work. The same remarks apply to the ignition cables supplied to the Government for the tanks and W.O. lorries. The firm have a high reputation for armoured lighting cables in single, twin or triple core, brass and aluminium strip armoured, and they also are to the fore in making up cables for electric starters of motor cars, armoured or braided.

Hull and Women Drivers.—At a sitting of Hull Tribunal, at which conditional exemption was granted to some drivers and conductors of low military category, a discussion took place as to the employment of women as drivers. Mr. McCombe, the manager, appealed for a driver on the ground that he was doing work of national importance, and said that a woman could not perform the duties. The military representative cited the cases of several towns in the country where female drivers were employed. He had a report from the Cardiff tramway manager stating that there had been no loss of time by the women drivers on account of sickness. The Cardiff manager considered that women drivers had a delicate touch which just suited the duty. Mr. McCombe, in reply, said that anyone would think driving a tramcar was like playing a piano. Birmingham, Liverpool, Sheffield, Huddersfield, and Halifax would not have women drivers. London would not, and the majority of tramway managers were against having women drivers. He did not want to appear as a "dog in the manger," but it was his opinion that women were not suitable for the place. He thought they could not stand the strain.

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PERSONAL.

Mr. F. H. Rudd has been appointed chief engineer of Rochdale Corporation electricity department at a salary of £400, increasing by two annual increments of £50 each to £500.

Mr. R. Collins, of the Belfast staff of the Edison Swan Electric Company, has been appointed engineer and manager of the Galway Electric Supply Company.

Mr. J. C. Whiteley, general manager and engineer of South Shields Corporation tramways, has been granted an increase in salary of £100 per annum.

Mr. Thomas Copp, permanent way foreman for the Peterborough Electric Traction Company, has been appointed permanent way inspector of the Cape Town tramways.

Sapper J. Gimmell, R.E., who has been awarded the Military Medal for meritorious work performed under heavy shell fire, was formerly employed as a motorman on the Glasgow Corporation tramways.

Corporal Francis Archie Hirst, R.F.A., has been awarded the D.C.M. for exceptional bravery on the battlefield in Flanders. Corporal Hirst was formerly an electrician in the Blackpool Corporation tramways department, and joined the signalling section of the West Lancashire Territorial R.F.A., in November, 1914.

Mr. W. G. T. Goodman, chief engineer and general manager of the Adelaide Municipal Tramways Trust, recently arrived in London after spending some time in the United States. The voyage from New York occupied three weeks, and provided some interesting experiences. Under Mr. Goodman's direction, the Adelaide system has been electrified and steadily extended until to-day it includes over 100 miles of tramways and operates over 170 cars. In his last report, Mr. Goodman mentions that approximately 22 per cent. of all the employees of the department volunteered for service with the Forces. The Trust have generously made up the difference between the rate of pay received from the Military Authorities and the ordinary pay of these men. Mr. Goodman is president of the Tramway Officials Association of Australia, and just before leaving Adelaide he was elected president of the Federal Council of the Australian Electrical Association.

A Patriotic Family.—Captain Walter Courtis, R.E., youngest son of Major Sir John Courtis, chairman of Cardiff Tramways Committee, has been wounded in France, and is now in hospital in that country. The wound is in the left elbow, and is not serious. Prior to the war, Capt. Courtis was an officer in the Glamorgan Fortress Royal Engineers. He has seen service in the East, and when at Sinai he volunteered to fill a vacancy in the East Lancashire Engineers, and was drafted to France early in the present year. The eldest son, Captain J. H. Courtis, Oxford and Bucks Light Infantry, was killed in the advance on Bagdad in November, 1915. The other son is Dr. A. O. Courtis, who has been a surgeon in the Royal Navy for over two years. Miss Courtis is doing war work in France, where the youngest daughter is also engaged as a motor ambulance driver. Sir John Courtis has organised the Cardiff and district section of Welsh Motor Volunteer Corps, in which he holds the rank of major.

FINANCIAL REPORTS AND MEETINGS.

The Albion Motor Car Company have declared an interim dividend of 5 per cent. on the ordinary shares.

The Vulcan Motor and Engineering Company will pay a bonus of 10 per cent. free of income tax on the ordinary shares.

The Grimsby Electric Vehicle Company, Ltd., has been registered with a capital of £5,000, to undertake the manufacture of electric vehicles.

Brazilian Traction, Light and Power Company.—A quarterly dividend of 1½ per cent. has been declared on the fully paid cumulative preference shares.

Dumbarton Burgh and County Tramways Company.—The board announce a dividend of 3½ per cent. on ordinary shares for the past year, transferring £1,673 to the redemption account, £5,000 to the renewal fund, and £2,000 to the reserve, leaving £2,208 to carry forward.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended September 12 amounted to £57,506, an increase of £8,045 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to September 12 (twenty-three and a half weeks) the total receipts were £1,320,595, an increase of £169,792 on the corresponding period of 1916.

Ayr Corporation Tramways.—Treasurer Ferguson, at a meeting of the Ayr Town Council, mentioned that the tramway undertaking had had a very successful year. The receipts, which amounted to £21,074, were a record for the system, and £1,789 more than those for 1915-16. The working expenses showed an increase of over £1,000. The surplus was £300, as compared with a deficit of £10 in the previous year. The balance at the credit of the depreciation account was £16,249, and the reserve fund stood at £4,932.

Dundee, Broughty Ferry and District Tramways.—The annual report shows a considerable improvement on 1915-16. For the period, including £109 brought forward, and after providing for interest on debenture stock, etc., the credit balance was £2,595, which was just sufficient to pay the preference dividend and carry forward £165. For 1916-17 the credit balance is £3,983, which allows not only the full preference dividend, but gives ordinary shareholders 3 per cent., as well as £500 to renewals fund, and increasing the carry forward to £587.

Chloride Electrical Storage Company.—The report for the year ended March 31st last shows, after making provision for depreciation and for the reduction of investments to market value and for war taxation, a profit of £35,459. Dividends amounting to 10 per cent. have been paid, free of income-tax, on the ordinary shares, and the directors now recommend a transfer of £20,750 to reserve fund, making £22,500, and to carry forward the balance of £15,323.

Cape Town Consolidated Tramways and Land Company, Ltd.—The report for the year ended December 31, 1916, shows that there was a loss on the year of £630, as against £816 in the previous year. No dividends have been declared by the subsidiary companies during the year. The working of the Camps Bay Tramway Company, Ltd., resulted in a profit of £2,225, against £1,486 in the previous year. The number of passengers increased by 49,424, and the receipts by £543. The increased cost of operation was due to higher labour charges and increased cost of material.

olckow, Vaughan, and Co., Limited.—The trading profits for the year ended June 30, 1916, after providing for depreciation and estimated liabilities under the Excess Profits Duties and Munitions Levy Acts, were £510,185, and £135,707 was brought forward. Debenture interest absorbed £34,495, and dividends amounting to 11 per cent. were paid on ordinary shares. It is proposed to add £159,520 to the reserve (raising that fund to £250,000), and to carry forward £126,180. The board recommend a further distribution of 8½ per cent. for the past year on ordinary shares, making 12 per cent. for the twelve months. For 1914-15, the trading profit was £223,315, and the dividend 6 per cent. Owing to the new Finance Act having superseded the financial provisions of the Munitions of War Act, and to a further complication having been introduced by the Government taking control of the coal mines, the directors are obliged to defer the presentation of the balance-sheet for the year ended June 30, 1917.

CONTRACTS AND ORDERS.

Bolton Corporation have received tenders for the supply of a two-ton electric vehicle.

The London County Council has purchased a fire engine driven by Edison electric accumulators.

Hadfields, Ltd., have accepted a contract to supply special trackwork to Manchester Corporation Tramways.

The Barrow-in-Furness Corporation have decided to purchase a motor ambulance, a motor tender, and a motor fire engine.

The Brush Electrical Engineering Company, Ltd., have an order for an 800 k.v.a. transformer from Bradford Electricity Committee.

The Electric Construction Company, Ltd., are to supply motors for new plant for Wolverhampton Electricity Committee at £1,272.

The Metropolitan Asylums have decided to purchase two motor cars of the taxicab type, new or second-hand, for the use of the Asylums Committee.

The North British Rubber Company has supplied a number of gas holders for vehicles of the Scottish Motor Traction Company, which runs a number of omnibuses in Edinburgh.

Ilford Council have accepted the following tenders:—Two rotary converters, General Electric Co.; 4,400 yards of 6,600 volt cable, W. T. Henley's Telegraph Works; 3,600 yards of two-way stoneware conduit, Albion Clay Company.

Edison Accumulators, Ltd., have a contract for supplying a 2-ton electric vehicle with automatic tipping body to Salford Corporation, at £1,123. The Corporation have also asked to be given an option to purchase, within a reasonable time, a second vehicle at the same price.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended September 1 give total receipts of £195,693, or £14,126 more than in the corresponding week of last year. The total length of track included in the returns was 2,040 miles.

The receipts this year were at the rate of £95 18s. 6d. per mile of single track, and last year at the rate of £89, thus showing an increase for the week of £6 18s. 6d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash, Sept. 13, or previous	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	73½	73½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4½	58/9	61/10½
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69½	69½
4½%	4½%	Do. 4½% Deb.	100	98½	73½	72½
5%	5%	Do. 5% Deb.	100	96	68½	67½
—	—	Associated Omnibus Co., Ord. ..	5/-	¾	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1⅛	23/-	23/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102½	101½
—	1/-	Bath Electric Trams Pref. Ord.	1	½	3/3	3/3
6d.	6d.	Do. 5% Cum. Pref. ..	1	⅝	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	72½	72½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19½	19½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11½	9½	9½
4½%	4½%	Do. 4½% Deb.	100	96	76	76
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	45½	46½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	91½	92
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6⅛	6½
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91	90½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27½	27½
6%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	45½	45½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	53½	53½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28	28
6%	6%	Do. 6% Cum. Part. Pref.	100	—	73	73½
5%	5%	Do. 5% Deb.	100	92	76½	77
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	66	66
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref. ..	5	5½	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74½	74½
1/-*	1/-*	Cape Elec. Trams	1	⅛	10/3	10/8½
1/3	1/3	City of B. A. Trams	5	5½	83/9	86/3
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	78	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10⅛	10⅛
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	⅛	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	⅛	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	⅛	15/9	15/9
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9⅛	9⅛
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9½d.*	9½d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	⅛	1/-	1/-
6d.	6d.	Do. 5% Pref.	1	⅛	5/3	5/8
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61½	61
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	80½	81
5%	5%	Do. 5% Inc. Deb... ..	100	88½	78½	79½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	36½	36½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5½	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d. %*	9½d.*	Manaos Trams & Ltg. Ord. ..	1	⅛	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	63½	63½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33½	40½
—	—	Do. 1 Mt. 5% G.B. ..	—	84	49	49
—	—	Do. 6% Mt. Bds. ..	100	76	38½	34½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	92
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	⅛	19/-	19/-
9½d.*	9½d.*	New General Traction	1	¼	7/3	7/3
6d.	8½d.	Northern Gen. Trans. Ord. ..	1	⅛	13/3½	13/3½
6/-*	3/-	*Para Elec. Rlys. Ord.	5	4½	80/-	80/-
5%	5%	Do. 5% 1st Deb. ..	100	80½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	8/-	7/-
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/6	12/6
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	⅛	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	⅛	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	¼	20/6	20/6
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	87½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	78½	78½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/-	12/-	Shanghai Elec. Cons.	10	13	14½	13½
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	92½	92½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	⅜	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	80	80
—	—	Metropolitan Dist. Ord. ..	100	21½	16½	16½
—	—	Undgd. Elec. Rys. of London ..	10	21½	35/-	35/-
		Do. "A"	1/-	⅜	5/9	6/-
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102½	101½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	100½	100½
6%	4%	Do. 6% In. Bonds Rd. ..	—	88½	82	83½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

Names.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C.	Sept. 4	407	435	+ 28	22	9,863	+ 923
Aberdeen Corporation ..	,, 5	2,252	2,401	+ 149	14	31,590	+ 3 753
Ayr Corporation ..	,, 8	575	456	— 119	17	10,234	+ 810
Belfast City	,, 7	5,844	6,820	+ 976	23	143,082	+ 12,860
Birkenhead Corporation	,, 9	1,577	2,263	+ 686	23½	42,583	+ 6,440
Birmingham Corporation	,, 8	16,855	19,109	+ 2,254	23	412,708	+ 29,594
do. Motor Omnibuses ..	,, 8	1,043	1,211	+ 168	23	22,614	— 706
Blackburn Corporation ..	,, 5	1,323	1,521	+ 198	23½	35,776	+ 5,074
Blackpool & Fleetwood ..	,, 8	2,247	2,299	+ 52	35	33,102	— 451
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corporation	Sept. 12	2,998	3,366	+ 368	23	62,864	+ 3,382
Bradford Corporation ..	,, 1	8,136	7,446	— 690	22	170,693	+ 14,312
Brighton Corporation ..	Aug. 19	1,942	2,216	+ 274	20½	30,826	+ 4,084
Bristol	Sept. 7	5,372	6,377	+ 1,005	35	192,936	+ 16,062
Burnley Corporation ..	,, 8	2,008	2 221	+ 213	..	..	..
Burton-on-Trent Cor. ..	,, 9	295	327	+ 32	23	7,049	+ 610
Bury Corporation ..	,, 9	1,579	1,977	+ 398	23½	39,652	+ 4,843
Chatham & District ..	,, 6	1,410	1,530	+ 120	36	46,749	+ 2,743
Cork Electric	,, 6	598	636	+ 38	36	19,527	+ 1,193
Derby Corporation ..	,, 8	1,185	1,272	+ 87	23	27,907	+ 824
Dublin United	,, 7	6,739	7,393	+ 654	36	239,137	+ 23,665
Dundee City	,, 5	1,493	1,696	+ 203	16½	25,378	+ 2,238
East Ham Corporation ..	,, 8	1,329	1,481	+ 152	23	33,277	+ 2,316
Exeter Corporation ..	,, 7	472	469	— 3	23	9,527	+ 2
Glasgow Corporation ..	,, 8	23,809	27,170	+ 3,361	149	376,030	+ 44,158
Glossop (U.E. Sup. Co.) ..	,, 8	153	187	+ 34	36	5,366	+ 412
Halifax Corporation ..	,, 4	2,545	2,757	+ 212	22⅓	58,156	+ 4,158
do. Motor Buses ..	,, 4	53	52	— 1	22⅓	1,076	— 75
Hastings and District ..	,, 9	1,734	1,956	+ 222	36	44,721	+ 6,560
Huddersfield Corporation	,, 8	3,569	4,578	+ 1,009	23	77,525	+ 7,138
Hull Corporation ..	,, 8	3,067	3,566	+ 499	23	78,271	+ 5,175
Ilford U.D. Council ..	,, 8	697	838	+ 141	23	18,194	+ 1,855
Ipswich Corporation ..	,, 10	560	860	+ 300	23	16,397	+ 3,364
Isle of Thanet	,, 8	752	448	— 304	46	15,395	— 2,810
Kilmarnock Corporation	,, 8	182	217	+ 35	16½	3,256	+ 250
Lanarkshire	,, 6	2,500	3,007	+ 507	36	97,751	+ 15,209
Lancashire United ..	,, 5	2,205	3,152	+ 947	36	82,996	+ 18,318
Leeds City	,, 8	10,075	11,790	+ 1,715	23	255,946	+ 25,486
Leith Corporation ..	,, 8	913	1,119	+ 206	16½	18,231	+ 3,126
Leyton U.D. Council ..	,, 6	1,771	2,032	+ 261	23	44,625	+ 4,852
Liverpool Corporation ..	,, 1	14,964	15,884	+ 920	34⅔	535,205	+ 45,147
Llandudno & Colwyn Bay	Aug. 31	836	739	— 97	39½	13,261	— 878
London County Council	Sept. 12	49,461	57,506	+ 8,045	23½	1,320,595	+ 169,792
Maidstone Corporation ..	,, 6	247	282	+ 35	23	5,717	+ 536
Manchester Corporation ..	,, 8	19,099	21,693	+ 2,594	23	473,473	+ 32,966
Nelson Corporation ..	,, 8	235	273	+ 38	23	5,460	+ 344
Newcastle-on-Tyne Cor. ..	,, 8	6,373	8,156	+ 1,783	23	178,803	+ 26,143
New St. Helens & Dist. ..	,, 5	1,187	1,681	+ 444	10	16,595	+ 4,690
Northampton Cor. ..	,, 7	733	895	+ 162	23	19,025	+ 2,426
Nottingham Corporation ..	,, 6	4,187	4,603	+ 416	23	99,981	+ 9,337
Oldham Corporation ..	,, 9	2,504	3,049	+ 545	24	69,208	+ 7,301
Portsmouth Corporation ..	,, 8	3,320	3,675	+ 355	..	..	..
Preston Corporation ..	Aug. 29	1,187	1,189	+ 2	21½	25,786	+ 1,677
Provincial	Sept. 8	2,894	3,162	+ 268	49	113,601	+ 1,166
Reading Corporation ..	,, 6	975	1,163	+ 188	22½	23,801	+ 4,022
Rhondda Tramways ..	Aug. 30	1,399	1,541	+ 142	35	51,365	+ 7,310
Rochdale Corporation ..	,, 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	Sept. 12	1,657	1,858	+ 201	23½	36,299	+ 5,835
Salford Corporation ..	,, 10	5,607	7,026	+ 1,419	23½	155,535	+ 24,576
Sheffield Corporation ..	,, 9	10,599	12,573	+ 1,974	24	285,518	+ 32,178
Southampton Cor.	,, 5	1,916	2,341	+ 425	22½	45,497	+ 6,872
Southend-on-Sea Cor. ..	,, 5	1,351	1,186	— 165	23	24,909	+ 458
South Shields Cor.	,, 1	971	985	+ 14	22	21,234	+ 2,437
Sunderland Corporation ..	,, 9	1,872	1,969	+ 97	23	42,317	+ 3,337
Sunderland District	,, 5	724	792	+ 68	45	31,923	+ 4,521
Swindon Corporation ..	,, 5	240	302	+ 62	22½	6,226	+ 1,453
Torquay Tramways ..	Aug. 30	955	915	— 40	35	21 839	+ 1,419
Tyneside Trys. & Trmrds	,, 29	708	939	+ 231	9	8 658	+ 2 085
Wallasey Corporation ..	Sept. 8	1,596	1,898	+ 302	23½	38,565	+ 4,345
Walsall Corporation ..	,, 8	838	1,006	+ 168	23	22,327	+ 2,565
Walthamstow U.D. Coun.	,, 8	1,184	1,364	+ 180	23	29,909	+ 3,337
Warrington Corporation	,, 6	515	577	+ 62	23	12,154	+ 875
West Ham Corporation ..	,, 6	3,184	3,924	+ 740	22½	85,286	+ 9,827
Wigan Corporation ..	,, 6	1,716	2,036	+ 320	22	44,794	+ 5,961
Yorkshire (West Riding)	,, 9	1,912	2,437	+ 525	36	75 835	+ 12,733

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Sept. 9	£52,818	£53,759	36	£1,842,527	+ £17,720
Auckland .. (4 weeks)	Aug. 24	20,467	21,812	8	42,722	+ 748
Ballarat and Bendigo ..	June 17	2,794	2,849	12	10,451	+ 76
Brazilian Traction (Mlrs.)	July	7,429,000	7,795,000	30	52,441,000	+ 3,833,000
Brisbane	Aug.	37,900	36,925	34	263,240	— 1,890
British Columbia .. $	July	411,847	438,378	4	438,378	+ 26,531
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	July	26,340	26,288	52	39,167	+ 20,082
Calcutta .. .. Rs.	Sept. 8	72,433	71,115	36	2,446,630	+ 22,672
Cape Town	July	..	16,067	..	..	..
Carthagena and Herrerias	Aug.	2,081	4,164	34	34,099	+ 13,278
Cordoba	July	14,258	14,343	18	56,154	— 1,165
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Aug.	2,522	1,562	4	1,562	— 960
Hong Kong .. .. $	July 21	16,447	13,355	29	388,489	— 14,467
Kalgoorlie	May	2,921	2,692	21	12,793	+ 356
La Plata	Aug.	3,793	4,076	34	33,095	+ 532
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	May	..	233,765	..	..	..
Madras .. (2 weeks) Rs.	Aug. 31	34,066	38,031	34	553,976	+ 50,530
Manila .. .. $	May	53,900	61,500	..	..	..
Manaos .. .. Rs.	June	144,913	165,693	..	..	..
Montevideo	June	25,300	27,458	35	242,796	+ 1,728
Pernambuco	Sept. 9	3,437	3,804	35	184,379	+ 26,231
Peruvian .. .. $	Aug.	895,900	979,430	8	1,954,430	+ 223,100
Port Elizabeth	July	..	3,544	..	..	..
Rangoon	Aug.	4,253	4,788	34	39,191	+ 2,000
Shanghai .. .. $	July 11	21,375	23,308	..	..	..
Singapore .. .. $	July 28	11,713	12,505	30	389,766	+ 18,392
Toronto .. .. $	July	867,780	964,192	30	6,827,776	+ 624,788
Winnipeg .. .. $	July	242,688	242,797	30	1,916,167	— 27,995

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City Treasurer of Bradford, and

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THE

Tramway & Railway World

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All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

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The Corporation do not bind themselves to accept the lowest or any offer.

Kirkcaldy. WM. L. MACINDOE,
11th September, 1917. Town Clerk.

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H. A. HOWIE,
Engineer and Manager.

Electric Supply Department,
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September 18, 1917.

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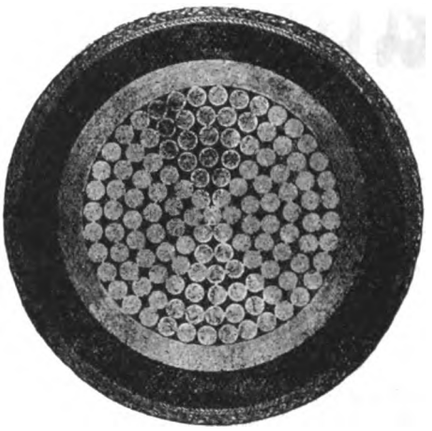

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SATURDAY, SEPTEMBER 22, 1917.

THE MUNICIPAL TRAMWAYS CONFERENCE.

In these days when many industries are in a state of doubt as to their future, it is encouraging to find the Municipal Tramways Association looking forward in the firm expectation of increased usefulness after the war. At the conference held this week at Blackpool there was a spirit of optimism which bodes well for the prompt resumption on the return of peace of those efforts toward the improvement and extension of local travelling facilities which have occupied the Association during the past sixteen years. This week's meeting was highly successful, and the subjects discussed are of much importance. All of them concerned questions of finance and traffic. In the conditions arising out of the war, this is natural. The present is not a time for indulging in engineering work or developments involving fresh capital expenditure. All energies are concentrated at present on keeping traffic going, and on conserving and improving the financial position, which war prices for everything has rendered difficult. Even the traffic problems were for the most part looked at from the point of view of increasing revenue and reducing expenditure. Mr. Mozley, in his presidential address, really gave a microcosm of the present situation and prospects, and he added several valuable suggestions, such as a single tramway authority for a large combined area so as to secure greater efficiency and economy. That is what we should have had if private enterprise had been allowed to develop in the tramway field; municipal enterprise has certainly been slow to see the advantages of combination. No doubt local jealousies are sometimes to blame, but the day for combination ought to arrive soon. The joint paper on tramway finance by Messrs. Barnard, Holford and Priestly is of value as emphasising the necessity for conducting municipal tramways as purely commercial undertakings up to, at least, the point of making ample provision for depreciation and reserve. Common sense characterised Mr. W. Murray's contribution on workmen's fares. The absurdity of carrying workmen at a loss was never made plainer. In the midst of present day stresses, it is not always easy to have the leisure or the disposition to consider developments, but the prophetic eye of Mr. Arthur Ellis is not dimmed. He gave a view of future tramway and light railway developments, the place of which cannot be taken by road automobiles. His remarks opened up vistas alike for the manager, the engineer, and the contractor, as well as for those of the public who will want to live in more rural surroundings. The repopulating of the countryside is still an unsolved problem. If there is to be a wider institution of small holdings, the exercise of [illegible]manship will be called for in relation to the importance which the war has given to the supplies of home-grown food. With more intensive cultivation and a consequent growth of allied industries, there would be some hope of electric railways taking a similar position to the Belgian steam lines that have so often been held up as models. Altogether the Association is to be congratulated on its 1917 gathering, and so is Mr. A. R. Fearnley, who last winter responded to the urgent request of the Council to resume his old duties of honorary secretary in the absence of Mr. Spencer on Government service. As in past years, we shall in an early issue give a full report of the proceedings.

MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The sixteenth annual conference of the Municipal Tramways Association, Incorporated, was held in the Savoy Hydro, Blackpool, on Thursday and yesterday. Since the war began, the Association's conferences have been held in London, but on this occasion it was felt to be desirable to meet the convenience of members in the North by holding the meeting in a place more quickly accessible to them. Thursday was devoted to a discussion of papers, and yesterday the annual business meeting took place. There was a good attendance, and the practical subjects dealt with in the papers resulted in discussions more than ample for the time available.

PRESIDENT'S "AFTER THE WAR" POLICY.

Mr. Henry Mozley, general manager, Burnley Corporation Tramways, in his presidential address, spoke first of the new tramways which were awaiting construction, and said that the practically total suspension of new construction owing to the war they might hope would cease within a reasonable time. The Association must prepare for the great changes which would occur in the new world to which they were looking forward. Discussing tramway finance, he questioned the wisdom of repaying capital expenditure within a very limited period. He also advocated the increase of fares where these had been made too low. For the purpose of convenient and economical working, he thought cars should be alike in design and dimensions on each undertaking. The same should apply on adjoining systems having intercommunication. He also advocated the amendment of the Tramways Act, 1870, so as to secure more liberty in carrying on tramway business. There should be one tramway authority in combined areas to control all traffic problems and development, to buy material in bulk, and to develop manufacturing for its own requirements. In connection with tramway undertakings, there would be no difficulty in carrying out one of the principal recommendations of the Reconstruction Committee for the establishment of an organisation representing employers and workpeople to consider matters affecting the trade.

TRAMWAY FINANCE.

Messrs. J. Barnard, Bolton; G. W. Holford, Salford; and P. Priestly, Oldham, contributed "Notes on Tramway Finance." They discussed questions relating both to income and expenditure. In regard to the former, they came to the conclusions that increased revenue might be obtained by an alteration in the maximum charges fixed by statute for the carriage of passengers, and that in the case of undertakings not already charging statutory rates further revenue might be obtained by increasing the fares and abolishing all forms of concessions. As to expenditure, the conclusions were, that it could only be reduced by the employment of the minimum number of employees required, by the utmost economy in the quantities purchased of the materials for maintenance, and by a careful review of the items which might offer opportunities for reducing expenses. Municipal tramway undertakings should always be regarded as commercial enterprises, and provision should invariably be made for depreciation and renewals on sound financial bases before contributions were demanded towards relief of rates or any other purpose.

RULE OF THE FOOTPATH.

A discussion on this subject was introduced by Bailie M. W. Montgomery, chairman of Glasgow Tramways Committee, in the

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absence of Mr. J. Dalrymple, general manager, Glasgow Tramways Department, who was detained by duties connected with the Royal visit to the Clydeside shipyards.

FARES FOR WORKMEN AND OTHERS.

"Differentiation in Fares for Workmen and Other Passengers on Tramways" was the title of a paper presented by Mr. William Murray, tramways manager, Walthamstow Urban Council. The author submitted that in principle the whole system of differential fares was entirely wrong, being unfair to the ordinary passenger, to the undertaking, and to the ratepayers. The only true basis for the fixing of fares was the cost of providing the service rendered, and all who availed themselves of that service should be required to pay on a uniform scale. Tramway employees should not be allowed to travel free. A tramway department, having incurred all the cost of providing a service, why should it be asked to sell the finished product at less than cost price, or give it away for nothing? He knew of no other commercial enterprise in which habitual selling under cost price had come to be recognised as the correct thing. Steps should be taken by all municipal tramway authorities to raise workmen's fares to the legal limit of ½d. per mile, to cancel all free passes, and to withdraw all special rates. If it could not be done, let the Council concerned purchase from the tramway department tickets or tokens at face value and distribute them at a reduced price. The executive of the Association should consider what steps could be taken to secure an alteration in the laws regarding workmen's fares.

DEVELOPMENT OF TRAMWAYS—OPENING UP OF RURAL AREAS.

A discussion on this subject was opened by Mr. Arthur Ellis, city electrical engineer and tramway manager, Cardiff. He said that after the war great openings for tramway undertakings must arise, and it was probable that we should not see a return of the larger railways catering for short-distance passengers for a long time. Tramways or light railways must solve the problem of providing means of access to, and for carrying the produce of, small holdings and allotments. Villages and hamlets would spring up with mushroom-like rapidity, and these would have to be provided for. The workers, better off financially, would live in them well outside the great towns. The tramway car should be the pioneer in this "after the war development." It only remained to decide the form of track and general equipment to make the town and country tramways both a necessity and an unbounded advantage. The development of tramways should be undertaken by local authorities, if not undertaken as a national work.

REVISION OF FARES.

At the September meeting of Torquay Corporation, the town clerk, in reply to a question, said he did not receive any official intimation of the Tramways Company's intention to raise the fares 50 per cent. The Council referred the matter to the General Purposes Committee.

Cardiff Tramways Committee were informed by the general manager on Sept. 18 that the withdrawal of transfer tickets had resulted in an increase of £470 in receipts for August as compared with August, 1916, and a still larger increase would accrue during September.

A special sub-committee of the Halifax Tramways Committee has been appointed to again consider the question of revising the fares. As far back as February 7 last, the Tramways Committee advised the Corporation to advance the fares 50 per cent., but the Council referred the proposal back for reconsideration. At the same time, the Corporation decided to reduce the service of cars by 25 per cent., although Alderman C. F. Spencer, chairman of the Tramways Committee, stated that if the existing fares were maintained, and the service reduced by 25 per cent., there would be a loss of £14,000 per annum. He added that besides having to provide £3,000 for war bonuses for the year 1917-18, there would be a payment of £2,400 for income tax, and an increase of £2,500 in interest on loans, with increased cost of materials. If the Finance Committe would forgo the £6,000 devoted to the relief of the rates the Tramways Committee might be able to pull through without increasing fares. The only response was a statement by the chairman of the Finance Committee that they recognised the difficulties of the Tramways Committee, but they could not forgo the sum received in relief of rates. They felt that if the fares were increased 50 per cent., and no advance was made in the tramway fares of Bradford and Huddersfield, shopping business from outlying districts which now came to Halifax would be diverted to those towns. In reply, Alderman Spencer stated that if no advance was made in the fares, the Council must be responsible for any loss. Apparently the Committee now find themselves compelled to take steps to again bring their recommendation before the Corporation.

Thornaby Council have passed a resolution regretting that the Imperial Tramways Company have found it necessary to increase their fares by 50 per cent., owing to war conditions, and expressing a hope that they will revert to the original charges as soon as possible. At the same time they desire the company to immediately take into consideration the desirability of allowing children and scholars under 16 years of age to travel at half-fares, as on the railways. One of the speakers especially cited the case of childrenholding secondary school scholarships, who have to travel to Stockton or Middlesbrough.

Cardiff Corporation are arranging for the conversion of premises into an electric vehicle garage

APPLICATIONS TO THE TRIBUNALS.

The Rhondda Tribunal have granted exemption to a number of tramway drivers, the chairman remarking that the members regarded them as being engaged on work of national importance. The general manager of the Tramway Company (Mr. Holliday), informed the Tribunal that out of 117 substitutes supplied by the authorities 46 were rejected as unfit for the duties of motormen and 52 were found to be quite useless.

At a sitting of Newcastle Military Tribunal on September 13, the case of 91 employees on the tramways came up for review. Mr. E. Hatton, the general manager, appealed for sympathetic consideration in view of the fact that the tramways were performing a great national service in daily conveying thousands of munition workers. Of the 91 men mentioned on the list 47 had entered the Army, 20 were in protected trades, and of the latter number 10 had been passed for general service. Substitutes had been found for many of those who had gone, but the Army authorities had not yet supplied the number of substitutes they promised. They were still 18 short, and they needed many more to sustain the regularity of the service during the winter months. He was doing his best to meet requirements, and he would like to point out that whilst in pre-war days they only ran 62 cars in the early morning, now they manned 175, representing all their stock. They would have been unable to do this but for the able help of a hundred auxiliary workers, whose services they warmly appreciated. The Tribunal granted the whole of the applicants two months' further exemption, and asked the military representative to send men to complete the staff.

Temporary exemptions until February 1 have been granted to 27 employees of Wigan Corporation Tramways, but three other men of less age have been released for service as the result of a consultation between the manager and the military representative.

An application was made by the military representative at Burnley, for the review of exemptions held by fourteen motormen, and the Tribunal refused a request by a representative of the men that the cases should be adjourned until the whole of the exemptions held by 90 employees came up for review. The ages in some cases exceed 35 years. Most of the men were ordered to join up on various dates.

EMPLOYMENT OF EX-SOLDIERS AND SAILORS.

The Central Committee, at 83, Pall Mall, S.W.1., of which the Hon. Arthur Stanley is president, directs the attention of employers to the position now affecting the employment of men discharged from the Services, without previous experience in the motoring industry. The withdrawal of private petrol licences has caused a great decrease in the demand for skilled men for private service, while at the same time the number of such men registered is still increasing. Men who register as skilled drivers object to accepting places in which they will be expected to undertake odd jobs. They are trained men, who cannot be expected to take unskilled employment.

Most of the openings now offered are for men ready to undertake commercial work, or who are willing to operate agricultural tractors. Such men, with a good repairing experience, or with workshop-training, can without difficulty be found employment, and therefore employers who offer wages only at a pre-war level stand little chance of having their requirements filled. Applications have been placed with the Committee for skilled men at 25s. to 30s. weekly, but this is hopeless, for an efficient man commands from £2 to £3 a week. Any idea that there are available discharged men who will take work at a cheap rate because they receive pensions is one to be discouraged. On the other hand, a limited number of applications have been received from men not physically fit to undertake full-time work. Such applicants are ready to accept a lower wage; always assuming that the work is of a suitable nature, and for part-time only. The number of men is extremely limited, and includes those who are under doctors' orders. A number of men limit their chances by stating they will accept work in specified districts, and that they will take only private situations. The Committee generally recommend them to accept commercial motor work.

Sitting on the Left Side.—It may often have been observed that when there are vacant seats on both sides in a car, passengers entering frequently show a preference for the left-hand side. The reason why this should be so was recently raised by a correspondent of *The Manchester Guardian*, and that journal has received a number of diversified explanations. Referring to these, it says:—"One explanation is that most people are right-handed; another that there is a natural tendency to turn clockwise; another finds more privacy on the left side, because passengers are not seen as they enter; others attribute the tendency to various developments of clutch and impetus on boarding the car." There are, however, two other material explanations which seem more important than those cited. One is that according to the system of ventilation adopted on many cars there is less draught on the left than on the right-hand side. The other is that according to the rule of the road the car runs on the left track, and so cars and other traffic coming in the opposite direction pass on the right. There is thus to nervous passengers a greater feeling of security on the left side of the car, because they are farther away from the traffic passing in the opposite direction. That there is something in this idea may be admitted, especially as when meeting fast motor vehicles the combined speeds of the car and the other vehicle may well amount to 30 miles per hour.

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MISCELLANEOUS NEWS AND NOTES.

New Generating Station for Sheffield.—The City Corporation have approved of the plans for the erection of a new power station at Blackburn Meadows.

Loss of Electrification Materials.—Included in the cargo of the *Mongolia*, sunk in the Mediterranean, was a large quantity of material intended for use in the electrification of the Victorian Railways.

Juvenile "Jumpers."—Fines ranging from 2s. to 5s. have been imposed by the Liverpool Bench on children who have been caught jumping on the tramcars for free rides. The practice has lately caused several accidents.

Electric Vehicles at Southend.—The Corporation have decided to instal a motor generator at the refuse destructor for charging the electrical tip wagons to be used for dust collection. The plant complete will cost £500.

Edinburgh Tramways Extension.—The Tramways Committee have passed a resolution in favour of applying to Parliament in next session for the power to construct a tramway between Edinburgh and South Queensferry, a distance of about eight miles.

Union for Dublin Employees.—A branch of the Amalgamated Association of Tramways and Vehicle Workers has been formed in Dublin. The Union secretary has reported that it has achieved unqualified success among the employees of the Tramways Company.

A Singular Accident.—A fitter named Graham was fatally injured while a passenger on the upper deck of a Glasgow car on Sept. 10. The trolley jumped the wire and Graham got up to replace it. The car passed under a railway bridge, when the trolley pole struck the bridge and rebounding hit Graham on the head, fracturing his skull.

Lack of Materials and Labour for Repairs.—Owing to the impossibility of obtaining sufficient spare parts and materials, it has become a common practice to dismantle a car in order to repair others. Bradford is among the places adopting this expedient, and the car shops in this city are also handicapped by a shortage of labour, thus delaying repair work.

Plymouth Universal Fare.—Great success continues to attend the institution of a universal fare on the amalgamated Plymouth and Devonport Tramways. The only drawback is the inability, owing to war conditions, to give the track and cars adequate attention as regards repairs. Recently the Theatre terminus has been more conveniently arranged for the marshalling of the cars.

The Lack of Cars.—Sheffield Tramways Department are badly in want of additional cars to meet the increased traffic and to enable repairs to be made to cars now in use. The weekly receipts now amount to nearly £2,000 in excess of the total for the corresponding period of last year. The general manager has been authorised to negotiate with an undertaking that has two single-deck cars for sale.

London United Tramways' Assessment.—An appeal is under consideration by Brentford Assessment Committee for a reduction of the assessment of the London United Tramways, Ltd. The present amount is £40,000 gross, £10,302 rateable, and the grounds of the appeal are depreciation and a falling off of revenue. The committee assert that the company ask for practically a reduction to nil.

Track and Overhead Renewals.—Rochdale Tramways department are to renew the overhead equipment of the line between Heybrook and Littleborough. At Maidstone the Light Railways Committee have been authorised to obtain five pairs of points and crossings. Application has been made to the Local Government Board for sanction to borrow £1,800 for the installation of mechanical coal handling apparatus.

Short Distance Passenger Problem.—Repeated complaints are made of would-be long distance passengers being crowded out at Bradford by persons who use the cars for short journeys. As a remedy a suggestion has been offered that on the routes affected the conductors should not issue tickets unless through fares are paid. Before that course can be adopted, a legal difficulty would have to be overcome, viz., that a car is open to any person who pays a fare.

Alcohol Engine Wanted.—Mr. Horace Wyatt, secretary of the Alcohol Motor Fuel Committee of the Imperial Motor Transport Council, 39, St. James's Street, S.W.1, desires information regarding the cost of efficient alcohol engines and the probable date of delivery to Australia. The committee require the information for the Advisory Council of Science and Industry of the Commonwealth of Australia, with a view to exhibit an engine at work at agricultural shows and other exhibitions. By that means it is hoped to excite public interest in the use of alcohol as a fuel.

Settlement of Two Strikes.—Rawtenstall Corporation tramway employees have accepted in settlement of their demands a bonus of 4s. per week for employees over 18 years of age, payable as from September 1. For three days the employees ceased work. On September 12 the motormen engaged on the Wallasey Corporation cars went on strike as a protest against the proposed introduction of women to be trained as drivers. The women conductors also ceased work, and a demand was made that the full standard wage should be paid to them. Later in the day, the strikers agreed to resume on the understanding that the Tramways Committee would give full and immediate consideration to their grievances. The Tramways Committee on September 19 again decided to recommend the Council to proceed with the proposal for experimenting with women drivers. They declined to grant an extra farthing per hour to women conductors on the ground that the Committee on Production are to consider an all-round advance. The demand for payment for time spent at the sheds in readiness for duty if required is granted.

Trolley Mishaps.—While a Blackburn car was running down a descent the trolley wheel left the wire, and, before the car could be brought to a standstill, the arm came in contact with the bracket of one of the standards. In the rebound the trolley struck two ladies who were passengers on the uncovered top deck, Each sustained a bad wound and were conveyed in an ambulance to the infirmary. A similar occurrence happened on a car from Jarrow to Tyne Dock while on the Church Bank. The wheel got off the wire, and, after ascending, rebounded and struck two men on their heads. Fortunately they were only stunned for a short time.

Electrification for Morecambe.—The Corporation Tramways—the last horse traction undertaking owned by a municipality—are to be electrified as soon as Parliamentary powers can be obtained and the materials become available. The Council came to this decision at their September meeting, when it was agreed that the application should be for the adoption of electricity or some other form of mechanical traction. The undertaking was purchased from a company in 1908, but ten years before that date the Corporation had themselves constructed the Bare and East View section. Two Edison battery omnibuses are to be added to the existing small fleet of those vehicles as soon as possible.

Government Encouragement to Manufacturers.—Mr. L. A. Paish, of the Commercial Intelligence Department of the Board of Trade, addressing a meeting of the brass trade in Birmingham on September 17, spoke of the strenuous efforts being made in Germany to get all manufacturers into syndicates as the only way to regain the "place in the sun." The Board of Trade were anxious to co-operate with the manufacturers, and were prepared to find financial assistance in investigating any particular market. If manufacturers were to regain their trade after the war, it was necessary that they should combine against the organised competition of Germany, America and Japan. The question had been considered by a committee appointed by the Board of Trade, with the result that the Board has resolved to assist manufacturers to combine.

Gas for Motor Vehicles.—The Gas Committee of Manchester Corporation and the gas authorities for a radius of sixty miles around the City are arranging a uniform charge for gas for motor vehicles, and the fixing of meters to be operated by tokens. In the City alone there will be two dozen charging stations. Mr. W. M. Barrett, manager of the Manchester Gasworks, has been the moving spirit of the enterprise, and has invented a coal gas carburettor. He is about to place the data gained as the results of experiments with several vehicles before a meeting of the District Commitee of the Commercial Motor Users' Association. Mr. Leo Swain, chairman of the Committee, has invented a combination high-pressure metal and rubber container, which he has had in use for some time. A demonstration with coal gas will be given from 3 to 5 p.m. on October 10, at Messrs. J. I. Thornycroft's repair department, Pulford Street, Grosvenor Road, London, S.W.1.

Australian Tramways and Railways.—An official report on means of transport and communications in Australia, which has recently been issued, shows that at the end of June last year the length of electric tramway lines in the Commonwealth was 406 miles and that no fewer than three gauges were employed, namely:—3 ft. 6 in., 75 miles; 4 ft. 8½ in. gauge, 326 miles; 5 ft. 3 in., 5 miles. There were also 102 miles of steam tramways, 46 miles of cable tramways and 60 miles of horse tramways. There were 20,738 miles of Government railways and 1,149 miles of private railways open for traffic. The gauge variations (which are even more remarkable than in the case of tramways) and the length in miles of each gauge are as follow:—2 ft., 308 miles; 2 ft. 6 in., 122 miles; 3 ft. 6 in., 12,315 miles; 4 ft. 8½ in., 5,120 miles; 5 ft. 3 in., 5,041 miles. This total of 22,906 miles includes, as well as the two items given above, 1,019 miles of private railways used for special purposes.

After-War Trade with Italy.—*The Board of Trade Journal* states that H.M. Consul at Milan, (Mr. J. H. Towsey) reports that an engineer in Milan, who has been engaged in the engineering business for the last thirty years, wishes to enter into relations now with United Kingdom manufacturers of the undermentioned goods, with a view to making arrangements to represent them in Italy for trade after the war:—Steel castings for railways and tramways; axles, wheels, and steel bands for railway and tramway cars; drums and discs for steam turbines; shafts for steamers; railway and tramway points and crossings, etc. The enquirer is stated to have represented a United Kingdom foundry for upwards of twenty years. United Kingdom manufacturers of the goods mentioned above, desirous of being represented in Milan, may obtain the name and address of the enquirer on application to the Department of Commercial Intelligence of the Board of Trade, quoting the reference number (329).

Paying Wages out of Capital.—Presiding at the ordinary meeting of the Dumbarton Burgh and County Tramways Co., in Edinburgh, on September 12, Mr. George Balfour said that he viewed with the gravest apprehension the position in which this country would be placed as soon as the short burst of activity immediately following the war operations had passed away. The great mass of industrial workers in this country were being unfitted to stand the shock which must come, and the blame rested not so much with the workers as with those in authority, who, through lack of knowledge or lack of a sense of responsibility, either encouraged or acquiesced in conditions which were economically insupportable. They seemed to lose sight of the fact that at the present moment the greater portion of the wages distributed in this country was provided out of the capital funds of the country, and while this was inevitable to a certain extent in war time, it was a process which could not continue for many years without vitally sapping our national strength.

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PERSONAL.

Mr. D. McColl, general manager of the Shanghai tramways, sailed some weeks ago on a visit to Victoria, B.C.

Mr. J. S. Green, son of the borough surveyor of Haslingden, has been gazetted second lieutenant in the Royal Engineers.

Corporal F. A. Hirst, R.F.A., won the D.C.M. referred to in our issue of September 15, for his gallantry in volunteering for special observation work at great personal risk.

Mr. E. S. Shrapnell Smith has been appointed by the President of the Local Government Board as petrol economy officer to the Central Control Committee for Petroleum Products.

Lieut.-Colonel G. G. Ewer, of the Essex Regt., who has been awarded the D.S.O., was sales manager of the Stepney Council's Electricity department. He is serving in Palestine.

Sapper J. E. West, West Lancashire R.E., and late of the United Electric Car Company's Works, has been awarded the Military Medal for bravery and devotion to duty. He enlisted in October, 1914.

Lance.-Corporal E. T. Moore, Royal Welsh Fusiliers, who before joining the Army was in the employment of Cardiff Tramways, has been presented by the tramway employees with a gold watch and chain to commemorate the third award of the Military Medal to a Cardiff tramwayman. Mrs. Moore was the recipient of a gold chain and locket.

A Burnley V.C.—Mrs. Witham, wife of Private Tom Witham, Coldstream Guards, who has won the Victoria Cross and who was formerly in the service of the Burnley Corporation Tramways, has received a letter from Mr. H. Mozley, general manager, in which he says:—"I cannot refrain from offering my congratulations to your husband upon his splendid services in the war, which are being acknowledged by the King in granting him the V.C., an honour which means so much, not only to the winner, but to those who are associated with him. Although he was not very long in our service before he volunteered for the war, we feel that a little of the glory he has won is reflected upon the tramway staff, and all of us are heartily proud of what he has done. Kindly give him my heartiest congratulations."

The late Mr. W. S. Laycock, of Oakbrook, Fulwell, Sheffield, head of the firms of W. S. Laycock, Ltd., and Cravens, Ltd., Sheffield, manufacturers of railway material, left estate valued at £71,145.

Alderman John Miles's death during the first week in September, occasioned great regret on the part of the Mayor and Corporation and townspeople of Bolton. The expressions of grief and condolence were equally marked at the annual conference of the Municipal Tramways Association, for last year Alderman Miles was elected vice-president, and would this week have been proposed to fill the office of President. In moving his election as vice-president, Mr. Holford (general manager, Salford) remarked that he did not know a more courteous gentleman, and he was always willing to do anything for tramways in connection with the Association and with the work of the Lancashire Association. In acknowledging his unanimous election, Alderman Miles said he took a very warm interest in the Association, and in his humble way he had also tried to do the best he could for his own town, which he loved so well. Alderman Miles was the "father" of Bolton Corporation, which he entered in 1874, and was twice mayor. He had been a member of the Tramways Committee from its formation in 1899, and for many years he had acted as chairman.

FINANCIAL REPORTS AND MEETINGS.

Manila Electric Railroad.—The directors of the Manila Electric Railroad and Lighting Corporation have declared a dividend of 1½ per cent. ($1·50 per share) for the quarter ending September 30 on the common capital stock.

Aberdeen Suburban Tramways Co.—At the half-yearly meeting of this company on August 27, Mr. James Mearns, who presided, said that the net profit had slightly increased. There had been a gratifying rise in the revenue, and had it not been for the greatly increased expenses, they would have had a very good half year's business. The credit balance was £3,310, which the directors proposed should be dealt with as follows:—To place at credit of depreciation and renewal account, £1,200, bringing that account up to £17,900; to pay a dividend at the rate of 5 per cent. on the capital, which would absorb £1,561; and directors' fees, £31, leaving a balance of £517 to carry forward. The report was adopted and the directors were voted a further £100 of remuneration.

Birkenhead Corporation Tramways.—Mr. Cyril Clarke, manager of Birkenhead Tramways, states in his report for the year ended March 31 last that the total revenue was £80,748, being an increase of £7,927 over the previous year. The working expenses amounted to £42,106, and the surplus of £38,642 showed an increase of £4,654. After meeting fixed charges there is an available balance of £13,652, an increase of £3,082. A sum of £2,820 goes in relief of the rates, £5,000 to reserve fund, and £5,832 to the renewals fund. Owing to the depletion of the staff through the war and the impossibility of obtaining a supply of substitute labour, neither the permanent way nor the rolling stock are, says the manager, in the usual satisfactory state of repair at present, and whilst every effort is being made, it will be impossible to avoid heavy commitments for repair and renewal work after the war. With this in view, and also bearing in mind that the cost of labour and materials is certain to remain at a much higher level than pre-war, it behoves the committee, says Mr. Clarke, to build up their reserve fund to the greatest possible extent. A petrol-driven Halley Tower wagon had been purchased and proved extremely useful. The agreement between the Tramways and Electricity Committees regarding the working of the power station belonging to the Tramways Committee had been revised, and a sliding scale based on the price of coal, water, etc., had been agreed upon.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended September 19 amounted to £58,787, an increase of £9,438 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to September 19 (twenty-four and a half weeks) the total receipts were £1,379,436, an increase of £179,284 on the corresponding period of 1916.

Dundee, Broughty Ferry and District Tramways Company.—At the annual meeting on September 11, Mr. George Balfour, who presided, said that the company had now had time to ascertain the full effect of the sale of a portion of the line on the Craigie estate to the City of Dundee, and, in his opinion, the earning capacity of the line was substantially the same to-day as it was before they sold the short portion of the line above-mentioned. It was impossible to forecast future prospects under the present extraordinary conditions, but as far as the current year was concerned, judged by the receipts and expenditure, he thought they should show about the same result as for the year ending July 31 last. It was a satisfaction to the directors to be able to propose a distribution on the ordinary shares, which, unfortunately, owing to the effect of the war, had had to be discontinued for two years.

CONTRACTS AND ORDERS.

Hull Tramways Committee have placed contracts with Lotery and Co., Ltd., Canton & Co., and Rego Clothiers, Ltd., for employees' uniforms.

P. R. Baillie and Company have a contract to supply 100 miles of rubber-insulated wire, at £2,800, to the New Zealand Public Service Stores Tenders Board.

Victoria Railways Department have placed a contract with Noyes Bros., Melbourne, for vulcanised rubber electric light wire at £17 17s. 6d. per mile.

Siemens Bros. & Co., Woolwich, have a contract to supply feeder cable and feeder pillars, etc., to Kettering Council, at £1,737. There were eight tenders.

Wolverhampton Council have allotted the following contracts:—Messrs. Alley and McLellan, valves for pumping plant, £226; Rees-Roturbo Manufacturing Co., Ltd., two motor-driven pumps, £384; Electric Construction Co., Ltd., motors for new plant, £1,272; Film Cooling Towers, Ltd., cooling towers, £5,444; J. Spencer, Ltd., steam feed water pipes, £280.

Contractors' Increased Costs.—Glasgow Electricity Committee have advised the Corporation to allow an additional sum of £5,000 to Messrs. Babcock and Wilcox, Ltd., on their contract price of £24,000 for providing and erecting a coal conveyor and transporter at the Dalmarnock generating station. The addition is to provide for the increased cost of labour and materials.

New Glasgow Generating Station.—The Electricity Committee have recommended the acceptance of the appended tenders:—Reinforced concrete superstructure for a boiler house, turbine room, and workshop at the new Dalmarnock station, Messrs. Train and Taylor, £64,539; eight boilers, stokers with forced and induced draught, economisers, etc., Babcock & Wilcox, Ltd., £140,282; 12 sets of switch gear, A. Reyrolle and Co., Ltd., £33,985; 27 panels of additional switchgear at sub-stations, A. Reyrolle and Co., Ltd., £14,210.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended September 8 give total receipts of £208,847, or £29,704 more than in the corresponding week of last year. The total length of track included in the returns was 2,040 miles.

The receipts this year were at the rate of £102 7s. 6d. per mile of single track, and last year at the rate of £87 16s. 3d., thus showing an increase for the week of £14 11s. 3d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.,
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash Sep. 20, or previous.	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	73	73½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4¾	58/9	58/9
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¾	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69½	69½
4½%	4½%	Do. 4½% Deb.	100	98½	72½	73½
5%	5%	Do. 5% Deb.	100	96	67½	68½
—	—	Associated Omnibus Co., Ord. ..	5/-	½	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1	20/3	23/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102½	102½
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	3/3	3/3
6d.	6d.	Do. 5% Cum. Pref. ..	1	⅝	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	72½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	70	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19½	19⅝
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11¾	9⅝	9⅝
4½%	4½%	Do. 4½% Deb.	100	96	76	76
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	90½	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	45½	45½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	91½	91½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6⅞	6⅞
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91½	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27½	27½
6%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	44	45½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb. ..	100	96½	53½	53½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28½	28
6%	6%	Do. 6% Cum. Part. Pref. ..	100	—	73½	73
5%	5%	Do. 5% Deb.	100	92	76½	76½
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	66
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74½	74½
1/-*	1/-*	Cape Elec. Trams	1	⅛	10/3	10/3
1/3	1/3	City of B. A. Trams	5	5½	84/4½	83/9
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	78	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10½	10½
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	⅛	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	⅛	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	⅝	17/1½	15/9
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	¼	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9½	9½
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9½d.*	9½d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	⅛	1/-	1/-
6d.	6d.	Do. 5% Pref.	1	⅝	5/3	5/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61½	61½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81½	80½
5%	5%	Do. 5% Inc. Deb. ..	100	88½	79	78½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	33	36½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5½	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9½d.*	Manaos Trams & Ltg. Ord. ..	1	⅜	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
8½	8½	Manila Elec. R. R. & Light ..	$100	102	63½	63½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33	33½
—	—	Do. 1 Mt. 5% G.B. ..	—	84	49	49
—	—	Do. 6% Mt. Bds. ..	100	76	40	38½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	⅛	19/6	19/-
9½d.*	9½d.*	New General Traction	1	¼	7/3	7/3
6d.	8½d.	Northern Gen. Trans. Ord. ..	1	⅜	13/3½	13/3½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	75/-	80/-
5%	5%	Do. 5% 1st Deb. ..	100	89½	76	74½
—	—	Pernambuco Tram. & Power Ord	1	—	8/-	8/-
—	—	Do. 7% Non. Cm. Part Pf.	1	—	13/3	12/6
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	⅛	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	⅛	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	¼	20/6	20/6
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	87½	87½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	79	78½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/-	12/-	Shanghai Elec. Cons.	10	13	14½	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	92½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	¼	18/6	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	¼	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	80
—	—	Metropolitan Dist. Ord. ..	100	21½	16½	16½
—	—	Undgd. Elec. Rys. of London ..	10	21½	35/-	35/-
		Do. "A"	1/-	¼	5/9	5/9
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102½	102½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	100	100½
6%	4%	Do. 6% In. Bonds Rd. ..	—	88½	82½	82

*Indicates dividend for the year. In other cases the dividend is for the half-year

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

Names.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Sept 11	407	449	+ 42	23	10,312	+ 965
Aberdeen Corporation ..	,, 14	2,041	2,205	+ 164	15	33,795	+ 3 917
Ayr Corporation ..	,, 15	474	447	— 27	18	10,682	+ 784
Belfast City	,, 7	5,844	6,820	+ 976	23	143,082	+ 12,860
Birkenhead Corporation ..	,, 16	1,555	2,003	+ 448	24½	44,586	+ 6,887
Birmingham Corporation ..	,, 8	16,855	19,109	+ 2,254	23	412,708	+ 29,594
do. Motor Omnibuses ..	,, 8	1,043	1,211	+ 168	23	22,614	— 706
Blackburn Corporation ..	,, 12	1,417	1,778	+ 361	24½	37,555	+ 5,443
Blackpool & Fleetwood ..	,, 15	1,631	1,686	+ 55	36	34,789	— 396
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corporation	Sept. 19	2,619	2,825	+ 206	24½	65,689	+ 3,585
Bradford Corporation ..	,, 15	7,497	8,032	+ 535	24	187,121	+ 16,198
Brighton Corporation ..	Aug. 19	1,942	2,21[illegible]	+ 274	20½	30,826	+ 4,084
Bristol	Sept. 14	5,405	6,134	+ 729	36	199,070	+ 17,691
Burnley Corporation ..	,, 15	1,850	2,224	374	..	..	..
Burton-on-Trent Cor. ..	,, 16	287	326	+ 39	24	7,376	+ 649
Bury Corporation ..	,, 16	1,449	1,736	+ 287	24½	41,418	+ 5,129
Chatham & District ..	,, 13	1,420	1,429	+ 9	37	48,178	+ 2,752
Cork Electric	,, 13	583	626	+ 43	37	20,153	+ 1,237
Derby Corporation ..	,, 15	1,142	1,245	+ 103	24	29,152	+ 927
Dublin United	,, 14	6,803	7,269	+ 466	37	246,407	+ 24,097
Dundee City	,, 12	1,512	1,639	+ 127	17½	27,017	+ 2,352
East Ham Corporation ..	,, 15	1,335	1,471	+ 136	24	34,748	+ 2,453
Exeter Corporation ..	,, 14	454	453	— 1	24	9,980	+ 1
Glasgow Corporation ..	,, 15	24,085	27,615	+ 3,530	15½	403,646	+ 47 5:2
Glossop (U.E. Sup. Co.) ..	,, 15	151	186	+ 35	37	5,552	+ 447
Halifax Corporation ..	,, 11	2,412	2,817	+ 405	23½	60,973	+ 4,563
do. Motor Buses ..	,, 11	52	55	+ 3	23½	1,132	— 71
Hastings and District ..	,, 16	1,552	1,819	+ 267	37	46,540	+ 6,822
Huddersfield Corporation ..	,, 15	2,849	3,219	+ 370	24	80,743	+ 7,502
Hull Corporation	,, 15	3,106	3,483	+ 377	24	81,754	+ 5,552
Ilford U.D. Council ..	,, 15	695	809	+ 114	24	19,003	+ 1,966
Ipswich Corporation ..	,, 15	560	793	+ 233	24	17,141	+ 3,596
Isle of Thanet	,, 15	642	373	— 269	50	15,768	— 3,079
Kilmarnock Corporation ..	,, 15	182	205	+ 23	17½	3,461	+ 273
Lanarkshire	,, 13	2,586	3,066	+ 480	37	100,817	+ 15,689
Lancashire United	,, 12	2,020	2,966	+ 946	37	85,964	+ 19,185
Leeds City	,, 15	9,823	11,579	+ 1,756	24	267,526	+ 27,098
Leicester Corporation ..	,, 15	3,396	3,937	+ 541	..	..	..
Leith Corporation	,, 15	914	1,129	+ 215	17½	19,360	+ 3,340
Leyton U.D. Council ..	,, 13	1,787	1,927	+ 140	24	46,552	+ 4,992
Liverpool Corporation ..	,, 15	14,367	16,757	+ 2,390	36½	568,881	+ 49,794
Llandudno & Colwyn Bay	,, 7	781	723	— 58	40½	13,983	— 949
London County Council	,, 19	49,340	58,787	+ 9,438	24½	1,379,436	+ 179,284
Maidstone Corporation ..	,, 13	256	284	+ 28	24	6,001	+ 565
Manchester Corporation ..	,, 15	14,507	21,498	+ 2,901	24	494,935	+ 35 822
Nelson Corporation ..	,, 8	235	273	+ 38	23	5,460	+ 344
Newcastle-on-Tyne Cor. ..	,, 15	7,005	8,208	+ 1,203	24	187,011	+ 27,415
New St. Helens & Dist. ..	,, 12	1,130	1,681	+ 551	11	18,276	+ 5,223
Northampton Cor.	,, 14	725	897	+ 172	24	19,921	+ 2,597
Nottingham Corporation ..	,, 13	4,062	4,671	+ 608	24	104,653	+ 9,946
Oldham Corporation	,, 16	2,414	2,908	+ 494	25	72,116	+ 7,794
Portsmouth Corporation ..	,, 15	3,370	3,601	+ 231	..	..	..
Provincial	,, 15	2,951	2,967	+ 16	50	116,568	+ 1,119
Reading Corporation	,, 13	983	1,152	+ 169	23½	24,954	+ 4,191
Rhondda Tramways	,, 13	1,449	1,659	+ 210	37	54,650	+ 7,658
Rochdale Corporation ..	Aug. 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	Sept. 19	1,682	1,870	+ 188	24½	44,005	+ 6,024
Salford Corporation	,, 17	5,369	6,727	+ 1,358	24½	162,264	+ 25,936
Sheffield Corporation	,, 16	10,612	12,586	+ 1,974	25	208,104	+ 34,151
Southampton Cor.	,, 12	1,900	2,310	+ 410	23½	47,807	+ 7,282
Southend-on-Sea Cor.	,, 12	1,225	999	— 226	24	25,908	+ 232
South Shields Cor.	,, 15	869	985	+ 116	24	23,236	+ 2,659
Sunderland Corporation ..	,, 16	1,638	1,912	+ 274	24	44,229	- 3,611
Sunderland District	,, 5	724	792	+ 68	45	31,923	+ 4,521
Swindon Corporation ..	,, 12	225	293	+ 68	23½	6,519	- 1 583
Torquay Tramways ..	,, 13	976	1,061	+ 85	37	24,017	+ 1,636
Tyneside Trys. & Trmrds.	,, 5	715	947	+ 232	10	9,606	- 2,317
Wallasey Corporation ..	,, 15	1,442	1,611	+ 169	24½	40,176	- 4,515
Walsall Corporation	,, 15	819	1,010	+ 191	24	23,337	+ 2,757
Walthamstow U.D. Coun.	,, 15	1,180	1,310	+ 130	24	31,219	+ 3,515
Warrington Corporation ..	,, 6	515	577	+ 62	23	12,154	+ 875
West Ham Corporation ..	,, 13	3,268	3,772	+ 504	23½	80,058	+ 10,330
Wigan Corporation	,, 13	1,766	2,068	+ 302	24	46,861	+ 6,262
Yorkshire (West Riding) ..	,, 16	1,806	2,260	+ 454	37	78 095	+ 13,187

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Sept. 16	£51,992	£53,807	37	£1,896 334	+ £10,535
Auckland .. (4 weeks)	Aug. 24	20,467	21,812	8	42,722	+ 748
Ballarat and Bendigo ..	June 17	2,794	2,849	12	10,451	+ 76
Brazilian Traction (Mlrs.)	July	7,429,000	7,795,000	30	52,441,000	+ 3,833,000
Brisbane	Aug.	37,900	36,925	34	263,240	— 1,890
British Columbia .. $	July	411,847	438,378	4	438,378	+ 26,531
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Aug.	24,413	26,714	4	26,714	+ 2,301
Calcutta .. .. Rs.	Sept. 15	73,566	72,540	37	2,519,170	+ 21,646
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Aug.	2,081	4,164	34	34,099	+ 13,278
Cordoba	July	14,258	14,343	18	56,154	— 1,165
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Aug.	2,522	1,562	4	1,562	— 960
Hong Kong .. .. $	July 28	17,172	11,660	30	400,149	— 19,979
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Aug.	3,793	4,076	34	33,095	— 532
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	May	..	233,765	..	..	..
Madras .. (2 weeks) Rs.	Aug. 31	34,066	38,031	34	553,976	+ 50,530
Manila .. .. $	May	53,900	61,500	..	..	..
Manaos .. .. Rs.	June	144,913	165,693	..	..	..
Montevideo	Aug.	26,044	28,860	43	300,253	+ 7,921
Pernambuco	Sept. 9	3,437	3,804	35	134,379	+ 26,231
Peruvian .. .. $	Aug.	895,900	979,430	8	1,954,430	+ 223,100
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Aug.	4,253	4,788	34	39,191	+ 2,000
Shanghai .. .. $	July 11	21,375	23,308	..	..	..
Singapore .. .. $	Aug. 11	13,711	12,907	32	415,039	+ 15,731
Toronto .. .. $	July	867,789	954,192	30	6,827,776	+ 624,788
Winnipeg .. .. $	July	242,688	242,797	30	1,916,197	— 27,995

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What's wrong with the Track?"

CHAPTER I.—CONCRETE FOUNDATIONS.
Defects—Causes of fracture—Method of laying concrete.

CHAPTER II.—CONCRETE MATERIALS.
Road metal—Water-gravel—Sand—Clinker-sand—Trass.

CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.
Patching—Partial repairs—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

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WEEKLY LIST OF TENDERS INVITED.

CITY OF SHEFFIELD.

Tramways and Motors Department.

The Tramways and Motors Committee are prepared to receive tenders for the manufacture and supply of Uniform Overcoats, Trousers, Reefers, Women Conductors' Costumes and Skirts, Straw Hats and Caps, and Macintoshes.

Particulars and Forms of Tender, together with "Conditions of Contract" and Specification, may be obtained, and samples of articles giving a general idea of what is required may be inspected, from the 24th September to the 5th October, 1917, between the hours of 10 a.m. and 12 noon, and 2 p.m. and 5 p.m. (Saturday 10 a.m. to 12 noon) at the Offices of the General Manager, Tramways and Motors Department, Division Street, Sheffield.

Any person or firm sending in a Tender will be required to comply with the Council's Form of Clauses respecting wages, hours and conditions of labour, and prohibition against assigning or underletting, as set forth in the "Conditions of Contract," a copy of which may be obtained from the undersigned.

No tender can be accepted from an employer who has not given notice to the Tailoring Trade Board, in pursuance of the Trade Boards Act, 1909, that he is willing for the minimum rates of wages fixed by that Board to be obligatory upon him.

Dated this 22nd day of September 1917.

Division Street, Sheffield. A. R. FEARNLEY, General Manager.

POSITIONS VACANT.

CHESTERFIELD CORPORATION ELECTRICITY DEPARTMENT.

Appointment of Chief Assistant Engineer.

The Corporation of Chesterfield is prepared to receive applications for the appointment of Chief Assistant Engineer to the Electricity Department.

The salary will commence at £230 per annum, increasing annually by £10 to £250 per annum.

Applications to be delivered to The Engineer, Electricity Works, Chesterfield not later than the first post on Monday, October 1.

Forms of application to be obtained from—

THE ENGINEER, Electricity Works, Chesterfield.

ABERDARE URBAN DISTRICT COUNCIL.

Wanted, a General Clerk. It is desirable, but not essential, that applicants should have had experience on wages and the general office work of an Electricity or Tramways Undertaking. The appointment will be for the duration of the war at least.

Male candidates must be ineligible or C3.

Applications, stating age, experience and salary required, to be sent not later than October 11, 1917, to

H. T. GOLDSWORTHY, Accountant.

Town Hall, Aberdare.
September 25, 1917.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

Electricity Department.

Applications are invited for the position of book-keeper and Invoice Clerk (permanent) in the Electrical and Tramways Engineer's Office. Persons with experience in an electricity or tramways department preferred.

Applicants must be ineligible for the Army. Commencing salary £110 per annum, and war bonus at the rate of 6s. 6d. per week, if married.

Apply in own handwriting, stating experience and age, to G. R. SPURR, Electrical and Tramways Engineer, Electricity Works, Priory Avenue, Walthamstow, E.17.

THE NORTH METROPOLITAN ELECTRIC POWER SUPPLY COMPANY.

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Applications are invited for position of Charge Engineer at the Willesden Power Station.

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RESIDENT ENGINEER,
Electricity Works,
Taylor's Lane,
Willesden, London, N.W.10.

COUNTY BOROUGH OF SALFORD.

Electricity Department.

Applications are invited for the position of Senior Clerk in General Office. Must be expert book-keeper, accustomed to obtaining costs of work, and with some commercial experience. Preference will be given to applicants with experience in office work of an electrical undertaking. Commencing salary £160 per annum and war bonus. Applications stating age, with copies of recent testimonials, to be forwarded to the Borough Electrical Engineer, Frederick Road, Salford, not later than 10 a.m., on Friday, October 5, 1917.

L. C. EVANS, Town Clerk.

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SATURDAY SEPTEMBER 29, 1917

RELATIONS WITH LABOUR.

Now that both the Municipal Tramways Association and the Tramways and Light Railways Association have given expression at their annual conferences to the desirability of securing improved relations with labour, it is to be hoped that means will be found of carrying the suggestion into effect. The first requirement is that the employers should be organised. The necessity of that step was urged early in the year by the Committee on Production, at whose suggestion the municipal and company undertakings of Lancashire and Cheshire formed a federation. This example has been followed by Yorkshire, and there is reason to believe that if the first mentioned combination had been brought into existence earlier some of the unpleasant results attendant upon recent arbitrations might have been avoided. A step in advance of the proposals advocated by Mr. E. H. Edwardes, at the congress of Tramways and Light Railways Association was taken by Mr. H. Mozley from the presidential chair of the Municipal Tramways, when he advocated the adoption of the leading recommendation of the Whitley report issued by the Reconstruction Committee. This suggests that there shall be established for each industry "an organisation representative of employers and workpeople for the regular consideration of matters affecting the progress and well-being of the trade from the point of view of all those engaged in it." By urging that the proposal should receive the immediate attention of the Municipal Association, Mr. Mozley takes a more sensible view than is expressed by people who are never tired of talking about the "new world" that is to be inaugurated "after the war." If improved relations between capital and labour are worth striving for, now is the best time for seeking to bring about an improvement. Moreover, this particular recommendation of the Reconstruction Committee is based upon an arrangement that exists in several of the more important industries; its effect has been beneficial to both parties, and there has been no question as to loss of dignity. Its greatest merit is that it prevents trouble arising, whereas the present inadequate machinery comes into play only when a rupture has taken place. During the war the overworked arbitration board, organised soon after the start under the obscure title of the Committee on Production, has had to be enlarged to enable the members to give more prompt consideration to disputes. In some instances strikes were precipitated by the delay entailed by the pressure of claims awaiting attention. Latterly there has been a marked improvement but the best efforts of tribunals cannot atone for machinery that might have prevented strikes. With many years' experience to guide him, Mr. Mozley would welcome such an organisation. Agreements among tramway authorities and their employees were, he urged, preferable to the imposition of an outside unsympathetic body that can only consider traction enterprises in the lump, and which is bound to disregard the local conditions of individual tramways. That regard can be paid to local conditions was made clear during the discussion of the matter by the Tramways and Light Railways Association. Following the mention of the subject before both organisations there should be no delay in according it the immediate attention for which Mr. Mozley pleaded when he urged that employees should be invited to "share our conferences and responsibilities." There will be no lack of work to claim the attention of the local and district committees if the Reconstruction Committee's proposal is adopted. The employees are likely to press for the conversion of war bonuses into permanent wages, and at their chief union's conference this year a resolve was arrived at to press a claim for an eight-hour day. This is likely to prove the most difficult question that has ever been raised

THE LANCASHIRE ARBITRATION.

In connection with the dispute arising from the recent arbitration proceedings a deputation representing Lancashire and Cheshire tramways attended the Committee on Production at Old Palace Yard, London, on September 25, to argue the question of increased wages for employees. Sir D. Harrel presided at the tribunal, and was assisted by Messrs. Elliott and Mosses. Mr. J. C. Jackson, barrister, Manchester, represented the tramways undertakings; Mr. Heath, (deputy town clerk), the Manchester Corporation Tramways; Mr. Wedderburn, K.C., represented Burnley; Mr. Neafsey, Vehicle Workers' Union; and Mr. Barnard, secretary, the local tramways authorities who are opposed to the increase. Others present included the chairmen and the general managers of the following tramways:—Ashton, Accrington, Blackburn, Bolton, Bury, Birkenhead, Darwen, Colne, Oldham, Preston, Rochdale, Salford, Stockport, Wallasey, Warrington, Wigan, Manchester, South Lancashire Tramways, Ltd., Stalybridge, Hyde, and Mossley Joint Board, and Oldham, Ashton, and Hyde Tramways Co. The application, which it is stated is due to the increased cost of living, was for an all-round advance in the form of war bonus for tramway employees, municipal or other. This would bring the total war bonuses of the adult male employees up to 16s. 6d. per week, and of the adult females up to 13s. 6d. per week. The advance to employees under 18 years of age would be 7s. The inquiry lasted for nearly three hours, and the decision will be made known in due course.

Bury Tramways Committee have declined an application for an advance of 7s. 6d. per week to the whole of the adult male and female employees, and 3s. 9d. per week to those under 18 years of age.

The employees of the Sunderland Corporation Tramways recently applied through the General Workers' Union for an increased war bonus. The matter was referred to the Committee on Production which, after hearing both sides, has made the following award: That in lieu of war bonus, the men shall receive a war wage advance of 12s. per full ordinary week; that the women should receive 2s. 6d., bringing their advance up to 8s. 6d. per week; that boys and youths under the age of 18 should receive 1s. 6d. per week in addition to the bonus already paid, bringing them up to 5s. advance. In all cases the bonus or war wage is to be taken into account in the calculating of overtime. At the meeting of the employees on September 24, the following resolution was carried unanimously:—"That we protest against the smallness of the award by the Committee on Production, and instruct the district secretary to submit to the Tramways Committee a further application for an increase of 3s. a week to men, to bring the total up to 15s., being similar to the amounts granted by the Committee on Production in the engineering, shipbuilding, ship-repairing, chemical, and other industries in Great Britain."

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MUNICIPAL TRAMWAYS ASSOCIATION.

THE NEW OFFICERS: ALDERMAN FLINT, PRESIDENT; MR. T. B. GOODYER, VICE-PRESIDENT.

After the close of the annual conference of the Municipal Tramways Association at Blackpool, the annual business meeting was held on Friday, September 21, Mr. Henry Mozley presiding. In opening the proceedings he referred with regret to the loss which the Association had sustained by the deaths of Alderman Miles and Alderman Brodie. The report of the Executive Council having been adopted,

The President moved that Alderman S. Flint, J.P., chairman of Leicester Tramways Committee, and Vice-President of the Association for the past year, be elected President for the coming twelve months. Mr. Flint's services, he added, had been of great value to the Executive Council.

Mr. E. Heap, chairman of Burnley Tramways Committee, seconded the motion, and it was unanimously agreed to.

Alderman Flint returned thanks for the honour conferred on him. With such able colleagues he hoped to perform the duties with satisfaction to the Association. He proposed as Vice-President Mr. T. B. Goodyer, manager, Croydon Corporation Tramways, whose ability and character were well known.

Mr. R. J. Bishop, vice-chairman of Walthamstow Tramways Committee, seconded the motion, and it was carried unanimously.

Mr. Goodyer in acknowledgment, said he would do his utmost to merit the selection.

The following were appointed members of the Executive Council to fill vacancies :—

Mr. A. Baker, general manager, Birmingham ;
Mr. J. M. McElroy, general manager, Manchester
Alderman R. Wood, chairman of the Stalybridge, etc., Tramways and Electricity Board ;
Councillor R. Mayne, J.P., chairman of Newcastle Tramways Committee ; and
Alderman C. F. Spencer, chairman of Halifax Tramway Committee.

Mr. C. J. Spencer, general manager, Bradford, was appointed hon. treasurer, and Mr. A. R. Fearnley, general manager, Sheffield, was re-appointed hon. secretary. Votes of thanks closed the proceedings.

At a meeting of the Managers' Section it was agreed that the manager's spring meetings should be resumed, the next meeting to be held in Birmingham.

MUNICIPAL TRAMWAYS AND THE WAR.

A FINE RECORD.

The Municipal Tramways Association (Incorporated) has issued the following statement of allowances granted to dependents, war bonuses, enlistments, employment of women, auxiliary drivers, etc., since the beginning of the war :—

	July, 1916.	July, 1917.
Number of municipal authorities replying to queries	88	84
Number of towns certified under Munitions of War (Amendment) Act	44	57
Number of employees at normal times	55,208	55,208
Number of men who have joined His Majesty's Forces	20,905	29,268
Percentage to total	38	53
*Number of men who have left municipal tramways undertakings to join munition factories	1,893	1,776
Percentage to total	3½	3·2
Amount paid to dependents of employees serving with His Majesty's Forces	£854,649	£1,437,603
Average allowance per man per week	10s. 7½d.	11s. 4½d.
Amount collected on cars for various national and other objects	£43,800	£84,509
Amount contributed by municipal tramway employees to various relief funds	£36,070	£38,170
Number of municipal systems employing women conductors	75	76
Number of women conductors	8,433	11,757
Number of municipal systems employing women drivers	7	18
Number of women drivers	176	611
Number of municipal systems employing auxiliary drivers	19	26
Number of auxiliary drivers (male)	320	564

* The figures under this heading are only approximate, as it is not known what particular section or unit the men have joined, and therefore in some cases these have been included in enlistments.

Fares at Halifax.—The Tramway Committee some time ago proposed to the Town Council an increase of 50 per cent. in all fares, with the exception of the workmen's fares, but the Council declined to approve the proposal. The Tramways Committee subsequently appointed a sub-committee to make inquiries, and a fresh proposal for an increase in fares will doubtless be made. In view of the fact that there has been a large increase in expenses and in allowances to employees with the Forces and their dependents, some advance is regarded as unavoidable.

EDINBURGH AND TRAMWAYS DEVELOPMENTS.

Although the Corporation of Edinburgh decided last year that the conditions created by the war gave them no alternative but to postpone taking action on the consultants' report upon developing the city's tramways, circumstances appear likely to force earlier action in one direction. In consequence of the Admiralty having purchased an extensive area on the south side of the Firth of Forth, the Tramways Committee consider that it is necessary to ask for powers in the next Session of Parliament to construct a line to South Queensferry, a matter that has been before them for three years. A motion for the Council to give notice to that effect has been accepted, and Councillor Harrison, chairman of the committee, informed the Corporation that they believed the extension would prove profitable, and that there were no engineering difficulties to be encountered. The borough engineer is preparing a report on the two available routes, and Councillor Deas has a scheme for taking further advantage of the extension, which, he says, is going to vitalise the whole of the south of the Forth. He has given notice of a motion to consider an extension to Port Edgar, with a section between this line and the Leith Ferry Road tramway, and also between Seafield Links and Portobello. By adding these comparatively short lengths there will be a tramway extending from Port Edgar to Port Seton.

In his report on the questions of the route, the borough engineer refers to route No. 1 by way of the Dean Bridge, and route No. 2 by way of Comely Bank. In either case it is insisted that an essential to success should be a through service from a convenient centre or terminus in the city to the terminus suggested at South Queensferry—the Hawes Pier. Route No. 1 starts from Hope Street, a terminus already authorised for tramways, thence along Queensferry Street, Dean Bridge, Queensferry Road, Blackhall, Davidson's Mains, Barnton, Cramond, Dalmeny, and onwards to Queensferry. Route No. 2 starts at the south end of Hanover Street, directly opposite the Mound, thence along Hanover Street, Queen Street (north side), and along the cable route to Stockbridge and Comely Bank, and thereafter continuing along the road towards Craigleith Station, whence its course to Queensferry would be identical with Route No. 1. It might not be found impracticable to operate the tramway service across the Dean Bridge without overhead wires, not because they are in any sense ugly, but because here the valley and the bridge in their combination have a character all their own within the city.

SUGGESTED ROAD AND FIELD TRACK.

Having regard to the advantages which both of these routes possess, it may be thought desirable that in any powers necessary to be obtained both should be included in the application. From Craigleith to Queensferry, these two routes, being on identical lines, are thence treated as one. As such the route may be either (1) partly on the road and partly on and through the fields, *ex adverso* of the road, or along the road for its entire length. The combination of road and field, it is pointed out, present much advantage. In this way those stretches of road such as along Cramond Bridge and parts westward therefrom in Linlithgowshire, against which objection might be taken by the County Council, are mainly avoided. Thereby a large capital sum is saved, and considerably increased speed is obtained. Convenient and frequent connections with the highway could be made. In the aggregate the measurements of road tramway and field tramway are :—On route No. 1, *via* Dean Bridge, on road 3 miles, in fields 5 miles—total, 8 miles ; route No. 2, *via* Comely Bank, on road 3⅜ miles, in fields 5 miles—total, 8⅜ miles. There are precedents for this method of tramway formation in Scotland. The gradients are allfeasible. The system of traction recommended is overhead electric. The service suggested is every ten minutes for, say, 16 hours daily. Conditions which are indicated as making for the success of the undertaking are :—(1) The Rosyth Naval Base, now an accomplished fact ; (2) the favourable attitude of the Admiralty to the Corporation ; (3) the increase of motor traffic ; (4) the near expiry of the cable tramway lease ; and (5) the contribution of such a tramway to the city's health and commerce.

Chester's Last Inspector.—In applying to the Cheshire Appeal Court for further exemption of a traffic inspector of Chester Corporation Tramways, the representative of the Tramways Committee stated that he was the only inspector left, and that as he possessed electrical experience he was able to remedy breakdowns. The exemption was extended until January 1 next.

Traffic Difficulties at Newcastle.—At the invitation of Mr. Ernest Hatton, general manager, Newcastle tramways, representatives of the shipbuilding and engineering yards on the Tyne and of trades unions met at the tramways office on Wednesday to discuss the complaints as to the inadequacy of the service of workmen's cars morning and evening. Sir Percy Girouard presided. The matter has become urgent, as the tribunal is considering the cancelling of the exemptions of certain men employed in the repair and maintenance of the tramways. The general manager made a statement as to the position in which he found himself owing to the lack of men, and the difficulties that would result if the staff were further depleted. After a discussion it was decided that the general manager should draw up a statement of the case, and that it should be supported by the employers and unions represented, with a view to bringing the matter before the Minister of Munitions and of urging him to relieve the situation, or at all events not to allow the staff to be further depleted.

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LEAVING CERTIFICATES TO BE ABOLISHED.

Mr. Winston Churchill, the Minister of Munitions, has fixed October 15 as the date upon which the abolition of leaving certificates under the Munitions of War Act shall come into effect. The abolition is of importance to Tramway undertakings, whose employees come under the provisions of the Act. It is hoped that no dislocation will follow the abolition of the certificate. In an appeal to all munition workers, the Trade Union Advisory Committee ask them not to change their employment without definite and substantial grounds, and to show that the output of munitions will not suffer by the abolition of leaving certificates, Finally, they appeal to all eligible workmen to put their services at the disposal of the Government by enrolling as war munitions volunteers.

The abolition of the certificate will render inoperative a portion of a note in the current issue of the *Journal of the Tramways and Light Railways Association* in which the publication of the amended Munitions of War Act, 1917, is prefaced by the statement that leaving certificates are still in force. Tramway operators, however, are affected by the remainder of the note, which is appended :— " With reference to Section 4 attention is called to orders 888, 889, 891, 893 recently made by the Ministry of Munitions and now available. The expression " Munitions Work " in relation to the Wages Orders in question is to be understood in the sense in which it is defined in Section 9 of the Munitions of War (Amendment) Act, 1916. The Ministry having certified that the supply of tramway facilities (certified undertakings) is of importance for the purpose of carrying on munitions work, any females employed on this work must in the present view of the Department be regarded as engaged on munitions work. Hence female tram conductors and car cleaners and trolley girls should be paid in accordance with the rates prescribed by the above Orders. These Orders are not intended to apply to clerical staff or to receiving clerks, if engaged in the office."

MISCELLANEOUS NEWS AND NOTES.

Lighting at Birmingham.—On the tramway routes ninety additional lamps are to be erected at dangerous crossings.

South Lancashire Fares.—On Monday the South Lancashire Tramways Company raised their fares by approximately 50 per cent. The lines serve colliery districts.

Sub-Station Equipment.—Sheffield Town Council have received the sanction of the Local Government Board to borrow £15,000 for sub-station equipment.

Appropriating Tramway Material in Germany.—At Krefeld and at several industrial centres in Germany, the military authority has stopped the tramway service and appropriated the materials for the use of the Army.

Good Traffics at Bournemouth.—The Corporation tramways have had an exceedingly busy season. The traffic receipts have been excellent and so far constitute a record for any season since the tramways were opened.

Pressure on the Embankment Shelter.—During the evening rush period the whole of the space of about three hundred yards between the two sheltered queues on the Victoria Embankment is frequently to be seen occupied by persons waiting for the south London cars.

Interruption of Glasgow Tramway Service.—On Saturday last, Glasgow tramway traffic was disorganised in consequence of a fire in George Square. The trolley wire at Queen Street and St. Vincent Place was cut as a safety measure, and the entire system was affected by the holding up of the cars.

Bolton and Farnworth Through Running.—Under an arrangement recently arrived at between Bolton Tramways Committee and the South Lancashire Tramways Company, through cars are being run between Bolton and Farnworth. Only one ticket is now issued, thus adding to the convenience of the passengers and conserving the paper supply.

Lighting Relaxations.—While there is now no cause of complaint with the lighting of the streets and public conveyances of the Metropolis, some provincial places are still endeavouring to secure improvements in both respects. Included in the number are Birmingham, Bradford, and Cardiff. A concession in the latter place is the removal of the discolouring from the windows of the tramcars.

Cessation of Sunday Running at Derby.—The recent withdrawal of the car service at Derby on Sundays has aroused very little complaint. Owing to the shortage of employees the management decided to abolish the service in order to conserve the energies of the employees to keep the weekday service going. It is stated that the motormen are working nearly 70 hours per week, and that for three years they have had no annual holidays.

To Prevent Accidents to Children.—Following the prosecution of a number of children for jumping on to tramcars while the conductor is away from the platform, the chief constable of Liverpool has drawn the attention of the Education Committee to a fatality arising from the practice. He has also asked that the attention of the children in the schools should be drawn to the evil. The Committee have asked the head teachers to take the necessary action.

Novel Charge Against a Conductor.—Burnley Corporation Tramways department, on September 19, summoned a woman conductor for failing to see that a passenger had a car ticket for a fare legally demanded. The deputy town clerk announced that on account of the death of the principal witness upon whom the prosecution relied, he could not proceed, and the magistrates granted a request by the defendant's solicitor that the summons should be dismissed.

L.C.C. Tramway Accident.—A London County Council tramcar with many passengers on board, travelling towards Victoria along the Stockwell Road, ran off the lines about ten o'clock on Sunday last, and mounting the pavement crashed into a public-house. The driver of the car was severely injured, and many of the passengers badly shaken. The front of the public-house was wrecked and the car badly damaged.

Swansea Tramway Lease.—The Council on Wednesday considered a proposal recommended by the Tramways Committee to unite the two previous leases into a new one between the Swansea Tramways Company and the Corporation. Councillor David Williams said that in 1942 the undertaking would revert to the Corporation, and it was important that nothing should be done to prejudice the interests of municipal ownership. After discussion, the recommendation was referred back to the Committee.

Lorry Blocks a Dundee Line.—Stoppage of traffic in Perth Road, Dundee, was caused on September 19 by the breakdown of a lorry which was carrying an iron beam weighing several tons. About 4.30 p.m. one of the rear wheels collapsed, and the west-going tramway line was completely blocked, so that traffic had to be carried entirely on the single line. After about four hours the lorry was sufficiently repaired to be moved, but it again broke down, this time across both tracks, so that traffic had to be suspended for the remainder of the evening.

Transfer Tickets for London Tramways.—The London County Council tramways are making certain modifications in the availability of workmen's and transfer tickets, commencing on October 3. The changes are designed to avoid the delay and inconvenience caused by misunderstandings between the passengers and the conductors. A petition is being circulated by some of the local trades and labour councils in the London district against the abolition of halfpenny fares and the recent restrictions on the issue of return tickets and workmen's fares.

Waste of Paper.—In view of the scarcity of pulp for tickets, and the high price charged for the manufactured article, the increased waste owing to the abolition of return tickets on the London County Council Tramways, is a matter that requires attention. The same remark is applicable wherever ticket boxes are not provided. Several months ago, the Paper Commission's Appeal for economy in the use of paper, contained a suggestion that more Tramway Authorities should provide boxes in which discarded tickets could be deposited. If it is a police objection that has prevented the adoption in London of this reform, steps should be taken to overcome it.

The Price of Copper.—After remaining for about three months at the £130 level, the quotation for standard copper was reduced towards the end of July by £5, and a further reduction of the same amount followed. On the Metal Exchange on September 24, as the result of the fixing of the price in New York at 23¼ cents, the quotation was marked down to £110. The actual figure was £110—£110 10s. for both cash and three months, representing a decline of roundly £10 for the spot variety and of somewhat less for future delivery. The fixed price being for a period of four months, any variation between cash and three months naturally disappears. Electrolytic was called £130—£136, as compared with £137—£143 previously

Excess Passenger Regulation.—In connection with the recent accident on the Dover Tramways, the general manager, Mr. Carden, has informed the Tramways Committee that motormen and conductors have explicit instructions what to do to prevent overcrowding. The Board of Trade inspector stated that there was no risk in taking six or eight standing passengers inside, and he expressed surprise that the Council had not obtained a by-law to permit of that being done. After considering the jury's recommendation that motormen should be licensed by the police, the Committee have advised the Council to adopt that course in regard to the drivers of the cars. It was felt that by following that course a greater incentive would be given to the police to assist in preventing over crowding.

Revising Tramway Employees' Exemptions.—Taking the cases as a whole, it cannot be said that traction employees are receiving more favourable consideration than other sections of the community when their exemptions are reviewed by the Appeal Courts or applications are made to local Tribunals for extensions. At Hull, a motorman, aged 37, and certified for general service, was refused exemption ; another, of 23, and C1, was given to November 1 ; a C1 motorman and car washer, aged 37, was directed to join the Army on October 1, and a C3 motorman, 34, obtained conditional exemption. Derby Tramways department's chief clerk was ordered to report for military service on January 1 next. Upon four Chatham motormen and a cashier being granted further conditional exemption, the military representative announced his intention to appeal.

The Fate of Dr. Diesel.—Considerable mystery has always been attached to the fate of the late Dr. Diesel, the inventor of the well-known engine that bears his name. He disappeared from the steamer on which he was crossing from Antwerp to Harwich in October, 1913. After bidding some friends good-night he apparently entered his state-room, but no one ever saw him again. It was reported that he had committed suicide owing to financial difficulties. The American papers are now publishing a statement ascribed to a Scandinavian, Axel Bjornson, described as a naval expert formerly in the service of the American Government. Bjornson affirms, on a statement alleged to have been made by a German commander, that Dr. Diesel was murdered by German agents to prevent certain plans in his possession relating to submarines from reaching the British Government.

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C.A.V. New Electric Starter.—On Tuesday a demonstration of their new geared type of electric starter for motor cars was given at the works of Messrs. C. A. Vandervell and Company.

Conversion of Morecambe Tramways.—Morecambe Corporation intend to apply for powers to use electric or other form of mechanical traction on the tramways which are now worked by horses.

No Stopping Places in Dover.—During a discussion on a reduction of the car service at Dover, consequent on the difficulty of obtaining motormen, a member of the Tramways Committee urged that there should be stopping places on the way. When people were too lazy to walk 20 yards to or from a starting point it was not a matter for wonder that the drivers could not keep time. Other councillors remarked that stopping places had been tried, and it was found that that method was not profitable.

Increasing Cost of Material in the United States.—The price of electric railway material in the United States is rapidly increasing. Rails now stand at over 100 per cent. above normal prices. Quotations are $75 a ton for short time delivery, and $55 a ton for delivery in twelve months. Some months ago rails were selling at $28·25 a ton. For special track work the increase in prices has been over 200 per cent. Copper wire is nearly three times above the normal price. Trolley wire is quoted at 38 cents a pound, as compared with 17 cents in 1915.

British Thomson-Houston Co.'s List.—In view of the increased demand for electrical motors to meet the needs of war industries, the continued publication of the periodical lists of the British Thomson-Houston Co., Ltd., is a convenience. The latest list, which is intended for filing in the company's binder, describes and illustrates continuous current motors. First of these is the protected type D.Q., the second is an enclosed ventilated D.Q. motor, the third is the pipe ventilated type, and the fourth is the totally enclosed class of the same machine. The list, which is obtainable at any of the branch offices, as well as at the head office at Rugby, also gives an approximate shipping specification.

Streets Taps for Cars.—The Commissioner of Police has informed the Kensington Borough Council that he is giving his attention to the demands that will arise after the war, when motor traffic will greatly increase in volume, for means of supplying vehicles with petrol, coal gas, and electricity from plugs on the foot-way. The Commissioner considers that in most districts where there is appreciable pedestrian traffic, the pavements are already too narrow, and any further encroachments for what are private, although it may be useful, purposes should be carefully watched. A committee of the Council has reported that sites might be found in Kensington, not necessarily in the main thoroughfares.

Air Raid Attacks.—On Monday and Tuesday London was visited by hostile aircraft. While there were some fatalities and a certain amount of material damage was done, both attacks failed, as only one or two air machines were able to penetrate within the defences of the Metropolis. There was happily no repetition of the destruction of a public vehicle, with the death of the driver and conductor and some passengers, such as occurred in a previous attack a few weeks ago. On Tuesday night over 130,000 persons took refuge in the tube railways. Traffic was consequently carried on with extreme difficulty, and many persons were unable to travel to their destinations. It is evidently impossible for the tube railways to carry on their business under such conditions, and other means will have to be found for providing the people with protection.

Conductor's Claim for the Loss of a Foot.—Judge R. Brown, K.C., sitting at Hyde County Court, dealt with a claim by a 19 year-old woman conductor, employed by the Ashton, Oldham, and Hyde Tramways Company, for compensation. Her solicitor stated that she went to the front of a car to get a jug in order to procure some tea. According to his instructions, she slipped off the car, but other evidence was to the effect that she jumped off while the car was in motion. She was run over and her right foot had had to be amputated. The answer filed by the respondents was that she exposed herself to risk not incidental to her employment. He would have had great difficulty in proving that the accident arose out of or in the course of her employment because she was at the wrong end of the car, and had no duty there. Under the circumstances he felt the respondents were dealing generously in agreeing to pay £85 in settlement and £10 10s. solicitor's costs. This arrangement was approved by the Judge.

The Industrial League.—In our issue of July 28 we referred to the inception of the Industrial League, whose aim it is to bring employers and workers together in friendly relationship, and thus to enable them to arrive at a common understanding on commercial and industrial questions. The League is anxious to obtain the help of all those interested; it is not confined to employers and workers, but will welcome everybody. Its mission is chiefly an educational one, and by the dissemination of information it will undoubtedly be able to do much to bring about a better understanding between employers and workers. The Industrial League should moreover be an effective weapon against the revolutionary tendencies of labour extremists and other enthusiasts. Considerable funds will be necessary to carry out the objects of the League, and it will welcome subscriptions and donations. There are two classes of subscriptions, one for individuals and another for firms and companies. Individual subscriptions have been fixed at £1 per annum, and those for firms and companies at £2. Already individual sums up to £500 have been promised, but donations however small will be welcome. The honorary treasurers are Messrs. G. J. Wardle, M.P., and Lee Murray, and the honorary secretaries, H. Scholey and J. Ames, of 56, Victoria Stree , Westminster, S.W.

Labour Unrest.—During the past week the *Times* has published an important series of articles on "The Ferment of Revolution," which should be carefully read by all students of current movements. In the concluding article on Friday the position is admirably summed up in the following words:—In spite of all that is said to-day of democracy we still have and need a governing element in the nation, though its membership is no longer drawn from one class or social stratum, and organised groups of citizens still need to be guided and sometimes to be controlled. To be precise, the question whether miners or railway men are to receive an advance of 25 per cent. on their wages cannot be settled by an appeal to the people. In the first place, it is impossible to take a vote upon such daily issues; and, secondly, the wage-earning community would be unable to grasp the details or to realise the financial consequences of each step. The "will of the people," if rightly guided, may be competent to decide great questions of principle, but it can never decide the details of administration. Such is the elementary truth which optimists and phrase-makers are continually endeavouring to befog. There must be Government; Government must think and administer; Government must decide and enforce its decisions. These are first principles, of which every one is denied by those who are carried away by the revolutionary ferment; and the conflict is joined to-day not by an attempt to dethrone a Sovereign, but by carrying on a strike which is forbidden by law. In the final resort all our argument leads up to the central question, whether Government should be prepared to resist a strike, and it answers this question in the affirmative.

PERSONAL.

Corporal E. T. Moore has been awarded the Military Medal. He was formerly a conductor in the service of the Cardiff Corporation.

Mr. E. E. Hoadley, consulting and resident engineer of Maidstone Corporation, has been granted an increase in salary from £500 to £550 per annum.

Captain S. Jefferson Gordon (6th West Yorkshire Regiment, and a Bradford resident) has been appointed Deputy Controller for the Priority Department of the Ministry of Munitions.

Mr. J. L. Gallard, mining editor of the *Financial Times*, has been promoted to a second-lieutenancy in the Motor Transport Service. Mr. Gallard has been for more than two years at the front.

Mr. H. W. Sanders, chief draughtsman, Manchester Corporation electricity department, has been appointed assistant constructional engineer to the City of Birmingham electric supply department.

Mr. J. Wilkinson, tramway electrical engineer, Hull, has returned to business after a serious illness of several weeks' duration, and will be glad if his business friends will note his new address, Tramway Power Station Buildings, Osborne Street, Hull.

Mr. G. Webster, general manager of Rochdale Corporation tramways, has been recommended by the Tramways Committee to receive an increase in his salary from £450 to £500 a year. Warm appreciation of Mr. Webster's services was expressed by several members.

Mr. J. M. McElroy was unable to attend the Municipal Tramways Conference at Blackpool last week. He has been constantly engaged in his duties at the Admiralty for some months, and is now taking a holiday in the South of England. Mr. McElroy was an original member of the Association and has attended every annual conference since 1902. He was president of the Association in 1906-7. At the recent conference he was re-elected a member of the Executive Council.

Mr. C. J. Spencer, who for some years past has acted as honorary secretary of the Municipal Tramways Association, was detained in London by his duties at the Admiralty and was unable to attend the conference at Blackpool. Mr. Spencer was an original member of the Association and had, we believe, never before missed a conference. He was president of the Association in 1909-10. At the conference last week he was elected hon. treasurer, and is thus *ex officio* a member of the Executive Council.

FINANCIAL REPORTS AND MEETINGS.

A. Darracq and Company, Ltd., have declared a dividend of 7 per cent. per annum on the preferred ordinary shares.

Aberdeen Suburban Tramways Company.—For the half year ended June 30 the accounts show a profit of £1,200, and including the balance brought forward there is an available balance of £3,310, A dividend of 5 per cent. has been declared for the past year, leaving £517 to be carried forward. The same rate of dividend was paid in each of the two preceding years.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended September 26 amounted to £57,800, an increase of £6,160 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to September 26 (twenty-five and a half weeks) the total receipts were £1,437,272, an increase of £185,481 on the corresponding period of 1916.

Birmingham Small Arms Company.—The accounts of this company for the last two years have not yet been published, owing to the non-adjustment of liabilities under the excess profits duty and the munitions levy. In the meantime a distribution of 5 per cent. on the ordinary shares was made in April and a final dividend of 15 per cent. is now declared, bringing the total return to 20 per cent. for the year 1916-17. The rate was the same in the two preceding years but the dividend is now payable on 50 per cent. more capital.

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The British Aluminium Company has declared a dividend on the ordinary shares for the six months ended June 30 at the rate of 8 per cent. per annum, less income tax.

The Position at Great Yarmouth.—What with the prohibition of the herring fishery and other war disadvantages peculiar to the east coast, coupled with the increase in railway fares, Yarmouth Corporation Tramways have undergone a trying experience. At the Council's September meeting, the Borough accountant and Mr. F. L. Turner, general manager, presented a report dealing with a suggestion that the lines on the Yarmouth side of the river should be closed, leaving only the Gorleston lines in operation. The mileage run in 1916-17 on the Yarmouth side was 206,932, out of a total of 500,688. The average cost per mile, including power, was 6·78 pence, and at this rate the cost of running in Yarmouth was £5,846. The earnings were £5,654 in fares, and £167, being half of the advertising rights, was also credited, making a total of £5,821, and leaving a loss of £25. The earnings for Gorleston, with a mileage of 293,756, were £10,157 in fares, and £167 for advertising rights, a total of £10,324. The expenses were £8,300, leaving a working profit of £2,024. In the event of the Yarmouth lines being closed for the remainder of the year, the position compared with the present year would be as follows:—Saving on depreciation, £1,700; saving on working loss, £25; total, £1,725 standing charges, £980; balance of saving, £745. Whilst about £1,360 would be saved in electric energy, there would be a considerable loss to the Corporation electricity works. The traffic return for August showed a net increase of nearly £35. Without reflecting in any way on the Tramways Committee, the Council accepted a resolution by Councillor Middleton to refer the whole question of running the tramways to the General Purposes Committee, particularly with reference to discontinuing traffic on the Yarmouth section until after the war.

Montreal Tramways Company.—For the year ended June 30, 1917, the gross earnings amounted to $7,374,295, compared with $6,443,309 the previous year, an increase of 14·45 per cent. The operating expenses increased $894,718, or 24·14 per cent. The ratio of operating expenses to passenger earnings was 62·40 per cent. compared with 57·53 per cent. The sum of $567,082 was charged to the contingent renewal account, representing expenditures made for special renewals, compared with $313,575 the preceding year. A sum of $792,848 was expended on maintenance and charged to operating expenses, compared with $583,894. This amount, together with $567,082 charged to renewal account, makes a total expenditure on upkeep of $1,359,930, compared with $897,470 last year. There was expended on capital account the sum of $1,509,488, compared with $320,872. During the year the company issued $3,000,000 of their 5 per cent. thirty-year gold bonds, from the sale of which there remains at the credit of the company the sum of $1,063,985 for extensions and improvements. While the passenger earnings show a satisfactory increase, the operating expenses have increased in greater proportion, the ratio of operating expenses to earnings being 62·40 per cent., against 57·53 per cent. Good progress has been made in the rearrangement of the power distribution. The installation of the first unit of 17,000 horse-power is completed, and work has been commenced on an additional unit of 17,000 horse-power. The work on the contract for machining shells referred to in the last annual report is practically completed, but some final adjustments remain to be made. An estimated amount has been provided for the war tax on the results of the whole operations, the present accounting period being the third and final period for this company under the Business Profits War Tax Act, 1916. The company had placed an order with the J. G. Brill Company for 100 motor and trailer cars of the latest type. These cars contain many improvements to assure comfort and safety. The Government last session appointed a Commission composed of five members with power to make a new contract between the city and the company, and the directors trust that this matter will be settled shortly, and result in enabling them to develop and maintain the system to the best interests of the public and the company.

CONTRACTS AND ORDERS.

Messrs. Frederick Smith and Company, of Halifax, have received an order for the supply of trolley wire to Glasgow Tramways Committee.

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WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-nine of the principal tramway undertakings in the United Kingdom for the week ended September 15 give total receipts of £205,088, or £27,599 more than in the corresponding week of last year. The total length of track included in the returns was 2,058 miles.

The receipts this year were at the rate of £99 13s. 1d. per mile of single track, and last year at the rate of £86 4s. 10d., thus showing an increase for the week of £13 8s. 3d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts. Leicester Corporation Tramways Department has, however, resumed the publication of the weekly traffic returns.

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WILLIAM WHITTINGHAM,
City Treasurer's Office, Bradford.

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5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	73	73
2/9	2/9	Anglo-Argentine 5% 1st Pref.	5	4⅞	65/-	58/9
2/9	2/9	Do. 5% Cum. 2nd Pref. ..	5	4⅛	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69½	69½
4½%	4½%	Do. 4½% Deb.	100	98½	72⅞	72⅞
5%	5%	Do. 5% Deb.	100	96	67½	67½
—	—	Associated Omnibus Co., Ord. ..	5/-	⅜	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1⅛	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	103	102½
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	3/3	3/3
6d.	6d.	Do. 5% Cum. Pref. ..	1	7/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71⅞	71⅞
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	70
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19½	19½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. ¾ 4½% Deb.	100	96	76	76
5%	5%	Do. ¾ 5% 2nd Mt. Deb. ..	100	100	88	90½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	46½	45⅜
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	91½	91½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6⅞	6⅞
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91⅜	91⅜
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27⅜	27⅜
6%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	43½	44
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	53½	53½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	29	28½
6%	6%	Do. 6% Cum. Part. Pref.	100	—	72½	73½
5%	5%	Do. 5% Deb.	100	92	77½	76½
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6⅝	6⅝
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4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71⅞	74½
1/-*	1/-*	Cape Elec. Trams	1	1/16	11/-	10/3
1/3	1/3	City of B. A. Trams	5	5½	85/-	84/4½
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82	78
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10⅜	10⅜
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	1/16	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	1/16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79¾	79¾
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44⅜	44⅜
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	3/16	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 13/32	9 13/32
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79¾	79¾
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	3/16	1/3	1/-
6d.	6d.	Do. 5% Pref.	1	3/16	5/6	5/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61⅞	61⅞
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81⅜	81⅜
5%	5%	Do. 5% Inc. Deb.	100	88½	79	79
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	33	33
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9¾d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	63½	63½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	72	71⅜
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33	33
—	—	Do. 1 Mt. 5% G.B. ..	—	84	42½	49
—	—	Do. 6% Mt. Bds. ..	100	76	40½	40
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	1/32	20/-	19/6
9¾d.*	9¾d.*	New General Traction	1	⅜	7/3	7/3
8¾d.	6d.	Northern Gen. Trans. Ord. ..	1	3/32	13/3½	13/3½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	75/-	75/-
5%	5%	Do. 5% 1st Deb. ..	100	89½	76	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/3	8/-
—	—	Do. 7% Non. Cm. Part Pf.	1	—	13/3	13/3
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8¾d.*	Potteries Elec. Trac. Ord. ..	1	1/32	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	1/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	3/32	19/3	20/6
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86¾	87¼
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	79¼	79
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/-	12/-	Shanghai Elec. Cons.	10	13	14⅜	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅜	18/6	18/6
3/-	3/-	Do. 6% Cum. Pref. ..	5	⅜	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	16½	16⅜
—	—	Undgd. Elec. Rys. of London ..	10	21½	33/9	35/-
		Do. "A"	1/-	⅜	5/10½	5/9
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102	102¼
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	100½	100
4%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	82½	82¼

*Indicates dividend for the year. In other cases the dividend is for the half-year

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	Latest Return. 1917	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917	Aggregate. Incr. or Dec.
Aberdare U.D.C. ..	Sept. 18	£407	456	+ 49	24	£10,768	+ 1,014
Aberdeen Corporation ..	,, 19	1,854	2,178	+ 324	16	135,974	+ 4,242
Ayr Corporation ..	,, 22	376	421	+ 45	19	£11,103	+ 830
Belfast City	,, 21	5,588	6,730	+ 1,142	25	156,740	+ 15,048
Birkenhead Corporation	,, 23	1,611	1,903	+ 292	25½	46,489	+ 7,180
Birmingham Corporation	,, 15	16,700	19,153	+ 2,463	24	431,862	+ 32,047
do. Motor Omnibuses ..	,, 15	979	1,213	+ 234	24	23,827	— 471
Blackburn Corporation ..	,, 19	1,375	1,788	+ 413	25⅜	39,343	+ 5,820
Blackpool & Fleetwood ..	,, 22	1,268	1,535	+ 267	37	36,324	— 128
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corporation	Sept. 26	2,431	2,985	+ 554	25½	68,675	+ 4,142
Bradford Corporation ..	,, £22	6,572	7,603	+ 1,031	25	194,724	+ 17,229
Brighton Corporation ..	Aug. 19	1,942	2,216	+ 274	20½	30,826	+ 4,084
Bristol	Sept. 21	5,162	6,170	+ 1,008	38	205,240	+ 18,699
Burnley Corporation ..	,, 22	1,738	1,927	+ 189	..	..	..
Burton-on-Trent Cor. ..	,, 23	290	340	+ 50	25	7,717	+ 698
Bury Corporation ..	,, 23	1,533	1,683	+ 150	25½	43,101	+ 5,279
Chatham & District ..	,, 20	1,378	1,395	+ 17	38	49,573	+ 2,769
Cork Electric	,, 20	527	611	+ 84	38	20,764	+ 1,321
Derby Corporation ..	,, 22	1,120	1,254	+ 134	25	30,407	+ 1,062
Dublin United	,, 21	6,269	7,368	+ 1,099	38	253,774	+ 25,175
Dundee City	,, 19	1,387	1,598	+ 211	18½	28,616	+ 2,558
East Ham Corporation ..	,, 22	1,314	1,497	+ 183	25	36,245	+ 2,635
Exeter Corporation ..	,, 21	439	447	+ 8	25	10,427	+ 9
Glasgow Corporation ..	,, 22	23,450	27,124	+ 3,674	16⅔	430,769	+ 51,217
Glossop (U.E. Sup. Co.) ..	,, 22	150	183	+ 33	38	5,735	+ 480
Halifax Corporation ..	,, 18	2,192	2,558	+ 366	24⅔	63,531	+ 4,930
do. Motor Buses ..	,, 18	51	54	+ 3	24⅔	1,186	— 68
Hastings and District ..	,, 23	1,329	1,553	+ 224	38	48,093	+ 7,046
Huddersfield Corporation	,, 22	2,805	3,210	+ 405	25	83,953	+ 7,494
Hull Corporation ..	,, 22	3,028	3,547	+ 519	25	85,302	+ 6,072
Ilford U.D. Council ..	,, 22	682	835	+ 153	25	19,838	+ 2,119
Ipswich Corporation ..	,, 22	518	787	+ 269	25	17,990	+ 3,866
Isle of Thanet	,, 22	494	309	— 185	51	16,077	— 3,264
Kilmarnock Corporation	,, 22	177	204	+ 27	18½	3,665	+ 300
Lanarkshire	,, 20	2,491	3,124	+ 633	38	103,941	+ 16,322
Lancashire United ..	,, 19	1,898	2,605	+ 707	38	88,572	+ 19,875
Leeds City	,, 22	9,990	11,232	+ 1,242	25	278,761	+ 28,407
Leicester Corporation ..	,, 22	3,370	4,011	+ 641	..	..	..
Leith Corporation ..	,, 22	855	1,131	+ 276	18½	20,491	+ 3,616
Leyton U.D. Council ..	,, 20	1,771	1,996	+ 225	25	48,548	+ 5,217
Liverpool Corporation ..	,, 15	14,367	16,757	+ 2,390	36⅔	568,881	+ 49,794
Llandudno & Colwyn Bay	,, 14	636	610	— 26	41½	14,593	— 975
London County Council	,, 26	51,640	57,800	+ 6,160	25½	1,437,272	+ 185,481
Maidstone Corporation ..	,, 20	243	295	+ 52	25	6,297	+ 617
Manchester Corporation	,, 22	18,501	21,118	+ 2,617	25	516,053	+ 38,445
Nelson Corporation ..	,, 22	209	221	+ 12	25	5,991	+ 427
Newcastle-on-Tyne Cor.	,, 22	7,027	8,150	+ 1,123	25	195,228	+ 28,651
New St. Helens & Dist. ..	,, 19	1,000	1,468	+ 468	12	19,743	+ 5,686
Northampton Cor. ..	,, 21	731	913	+ 182	25	20,835	+ 2,779
Nottingham Corporation	,, 20	4,084	4,693	+ 609	25	109,346	+ 10,554
Oldham Corporation ..	,, 23	2,511	2,770	+ 259	26	74,887	+ 8,053
Portsmouth Corporation	,, 22	2,839	3,123	+ 284	..	..	..
Provincial	,, 22	2,547	2,657	+ 110	51	119,225	+ 1,187
Reading Corporation ..	,, 20	909	1,111	+ 202	24⅔	26,066	+ 4,394
Rhondda Tramways ..	,, 20	1,412	1,661	+ 249	38	56,311	+ 7,907
Rochdale Corporation ..	Aug. 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	Sept. 26	1,789	1,895	+ 106	25½	45,900	+ 6,129
Salford Corporation ..	,, 24	5,611	6,448	+ 837	25½	168,713	+ 26,814
Sheffield Corporation ..	,, 23	10,752	12,236	+ 1,484	26	310,339	+ 35,635
Southampton Cor. ..	,, 19	1,737	2,165	+ 428	24⅔	49,973	+ 7,711
Southend-on-Sea Cor. ..	,, 19	1,054	916	— 137	25	26,825	+ 94
South Shields Cor. ..	,, 22	864	990	+ 126	25	24,226	+ 2,800
Sunderland Corporation ..	,, 23	1,679	1,859	+ 180	25	46,088	+ 3,792
Sunderland District ..	,, 19	640	807	+ 167	47	133,525	+ 4,769
Swindon Corporation ..	,, 19	222	294	+ 72	24⅔	6,813	+ 1,655
Torquay Tramways ..	,, 20	1,412	1,661	+ 249	38	56,311	+ 7,907
Tyneside Trys. & Trmrds.	,, 5	715	947	+ 232	10	9,606	+ 2,317
Wallasey Corporation ..	,, 22	1,352	1,608	+ 256	25½	41,784	+ 4,771
Walsall Corporation ..	,, 22	848	1,062	+ 214	25	24,399	+ 2,971
Walthamstow U.D. Coun.	,, 15	1,180	1,310	+ 130	24	31,219	+ 3,515
Warrington Corporation	,, 20	506	584	+ 78	25	13,309	+ 1,014
West Ham Corporation	,, 20	3,243	3,913	+ 670	24⅔	92,971	+ 11,000
Wigan Corporation ..	,, 20	1,732	2,048	+ 315	25	48,909	+ 6,609
Yorkshire (West Riding)	,, 23	1,894	2,209	+ 315	38	80,304	+ 13,502

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	Latest Return. 1917	Aggregate. Wks.	Aggregate. 1917	Increase or Dec.
Anglo-Argentine	Sept. 23	£50,087	£53,200	38	£1,949 534	+ £22,648
Auckland .. (4 weeks)	Sept. 24	20,467	21,812	38	42,722	+ 748
Ballarat and Bendigo ..	June 17	2,794	2,849	12	10,451	+ 76
Brazilian Traction (Mlrs.)	July	7,429,000	7,795,000	30	52,441,000	+ 3,833,000
Brisbane	Aug.	37,900	36,925	34	263,240	— 1,890
British Columbia .. $	July	411,847	438,378	4	438,378	+ 26,531
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Aug.	24,413	26,714	4	26,714	+ 2,301
Calcutta .. .. Rs.	Sept. 22	69,737	70,885	38	2,590,055	+ 22,794
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Aug.	2,081	4,164	34	34,099	+ 13,278
Cordoba	July	14,258	14,343	18	56,154	— 1,165
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Aug.	2,522	1,562	4	1,562	— 960
Hong Kong .. .. $	Aug. 4	19,717	15,109	31	439,845	— 24,587
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Aug.	3,793	4,076	34	33,095	— 532
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	July	..	237,832	..	..	..
Madras .. (2 weeks) Rs.	Aug. 31	34,066	38,031	34	553,976	+ 50,530
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	June	144,913	165,603	..	..	..
Montevideo	Aug.	26,044	28,860	43	300,253	+ 7,921
Pernambuco	Sept. 23	3,147	3,845	37	142,011	+ 27,537
Peruvian .. .. $	Aug.	895,900	979,430	8	1,954,430	+ 223,100
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Aug.	4,253	4,788	34	39,191	+ 2,000
Shanghai .. .. $	July 11	21,375	23,308	..	..	..
Singapore .. .. $	Aug. 11	13,711	12,907	32	415,039	+ 15,731
Toronto .. .. $	July	867,789	954,192	30	6,827,776	+ 624,788
Winnipeg .. .. $	July	242,688	242,797	30	1,916,197	— 27,995

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

Contracts for General Stores.

The Directors of the Great Northern Railway Company (Ireland) are prepared to receive Tenders for the Supply of the undermentioned Stores for six or twelve months from January 1, 1918:—

	No. of Form.
Axles and Tires (Steel)	1
Baskets, Brooms, Brushes, Mats, and Sponges	2
Bolts and Nuts, Studs, Pins, Rivets, and Washers	3
Boxes, Farm and Market Produce	4
Brass and Copper Sheets, Plates, Tubes, and Wire, Block Tin, Zinc, Spelter, and Patent Metal	5
Buckets, Oil Cans, Zinc Sheets, Galvanised Iron Sheets, Emery, etc.	6
Buffers and Axle Guards for Carriages and Wagons, Wagon Hinges, Barrow Frames, etc.	7
Canvas	8
Castings (Ordinary Iron), Fire-bars, Forgings, Crucibles, Cylinders, and Buffer Stops	9
Cement, Plaster of Paris, Slates, Glazed Ware Pipes, Fire-bricks, Tiles, etc.	10
Chain	11
Colours, etc. (ground in oil and dry), and Hall's Distemper, Wall Paper, etc.	12
Drysalteries	13
Electrical Fittings, Lamps, etc.	14
Electric Cable and Wire	15
Electric Light Carbons	16
Explosives, Fog Signals, and Carbide of Calcium for Acetylene Gas Lighting	17
Fastenings, Permanent Way	18
Fittings (Brass) for Gas and Water, Gas Burners, Gun-metal Steam Unions, Rain Water pipes, etc.	19
Gas Mantles	21
Gauges, Steam and Vacuum Brake	22
Glass	23
Hammer, etc., Handles, Barrows, Oak Keys, Loading Boards, and Scotches	24
Hinges (Wrought Iron and Brass), Locks and Keys, Hardware (Iron and Brass), Closet Basins and Seats, etc.	25
India-rubber Goods, Loco. Packing, Asbestos, etc.	26
Iron Plates, Bars, Angles, Tees, and Forgings (best Staffordshire and Yorkshire)	27
Lamps (Oil) and Brass Carriage Fittings, Oiler Pads, and Enamelled Iron Plates	28
Lead (ground in oil and dry), Sheet, etc.	29
Leather and Leather Goods, and Balata Belting	30
Nails	31
Overalls and Oil Skin Suits	32
Oils (Burning, Lubricating, etc.)	33
Plates (Steel Boiler), Steel Forgings, Fish Plate Liners, Cast Steel Engine and Tender Wheel Centres, Roof Bars, and Mild Steel Plates, Bars, Angles, Tees, and Channels	34
Rope, Twine, Flax, and Hemp Gaskin	35
Screws (Iron and Brass), Split Pins, etc.	36
Signalling Materials	37
Springs for Engines, Carriages, Wagons, etc.	38
Tin Plates	39
Timber, White American Oak Scantlings, St. John's Spruce Plank, Logs, Planks, Boards, Mouldings, Sheetings, etc.	40
Transfers (Carriage, etc.)	41
Tools (Edge), Saws, Files, Tool Steel, Carriage Keys, Hammers, Shovels, Spades, etc.	42
Tubes and Fittings (Iron), Wire, Wire Work, Panel Pins, Staples, and Point Rodding	43
Tubes (Steel — Galvanised), Cold Drawn Weldless for Boilers	44
Upholstery for Carriages, Curled Hair, Blinds, Rugs, Linoleums, Tape and Soft Goods	45
Varnishes, Enamel, Black Lacquer, and Sheet Dressing Composition	46
Waste (Cotton), Wick, Sponge Cloths, etc.	47

Forms of Tender can be obtained from the Secretary on payment of One Shilling for each form. Please do not send stamps.

Tenders must be for the supply of Goods in accordance with the Company's patterns; these patterns may be seen at the General Stores Depôt, Dundalk (they cannot be sent away for inspection), between the hours of 10 a.m. and 4 p.m. on each week day except Saturdays.

Tenders, made out on the Company's forms, should be delivered, under sealed cover, endorsed "Tender for Stores," to the undersigned, not later than 10 a.m. on November 1, 1917.

The Directors do not bind themselves to accept the lowest or any Tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
October 4, 1917.

THE SOUTH INDIAN RAILWAY COMPANY, LIMITED,

are prepared to receive Tenders for the Supply of Steel Tires for Locomotives and Rolling-Stock.

Specifications and forms of Tender may be obtained at the Company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Ltd., marked "Tender for Steel Tires for Locomotives and Rolling-Stock," must be left at the offices of the Company not later than one o'clock on Monday, October 15th, 1917.

The Company is not bound to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 20s. for each copy of the specification.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.1.

Finsbury Pavement House, E.C.2.
October 3rd, 1917.

BOROUGH OF MORECAMBE.

Electric Traction Committee.

The Electric Traction Committee invite Tenders for the supply of Electric-driven Omnibuses.

Specification, designs of 'bus bodies, and prices of omnibuses complete, delivered at Morecambe, to be sent to the undersigned not later than Thursday, the 18th day of October, 1917.

Further particulars can be obtained by application to Frank Marshall, Borough Surveyor, Town Hall, Morecambe.

The lowest or any tender will not necessarily be accepted.

T. PONSONBY TILLY, M.A.,
Town Clerk.

Morecambe.

POSITIONS VACANT.

ABERDARE URBAN DISTRICT COUNCIL.

Wanted, a General Clerk. It is desirable, but not essential, that applicants should have had experience on wages and the general office work of an Electricity or Tramways Undertaking. The appointment will be for the duration of the war at least.

Male candidates must be ineligible or C3.

Applications, stating age, experience and salary required, to be sent not later than October 11, 1917, to

H. T. GOLDSWORTHY,
Accountant.

Town Hall, Aberdare.
September 25, 1917.

FOR SALE.

One Cole, Marchent and Morley Cross-Compound Vertical Corliss Steam Engine, and engine type Westinghouse D.C. Generator; complete, with condenser, air pumps, grease extractor, steam and exhaust pipes, and, if required, electric cables, switches, circuit breaker, and rheostat; capacity, 1,000 kilowatts at 85 r.p.m. with steam at 160/180 lbs. pressure; generator, shunt and compound wound, 460/550 volts.

In excellent condition. Can be seen running, and prospective purchasers can witness steam consumption tests. The engine can be used for rope driving by removing the generator armature and substituting a rope pulley.—Apply, ELECTRICITY DEPARTMENT, Town Hall, Bradford.

BRASS CASTINGS.

Tramway Company operating own Brass Foundry can give quick delivery of castings from customers' own metal or otherwise. —Reply Box No. 65, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

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SATURDAY, OCTOBER 6, 1917.

WELFARE WORK AMONG WOMEN.

With so large a number of women engaged in work of national importance, it became necessary at an early stage for the Government and local authorities to take steps to care for their well-being. The provision made for that purpose has taken the form of rest clubs, and in these the workers have facilities for obtaining more nourishing food than most of them would otherwise secure. Equally important are facilities for recreation, the appointment of supervisors, and placing the management in the hands of the workers and the superintendents. Amid such surroundings it becomes easy for grievances to be put forward in a reasonable spirit, and for remedial measures to be promptly applied. Under such circumstances the women are the gainers in a physical sense, and also in personal well-being; their work is expedited, and the employers derive benefit. As at the outset of the war this country did not possess a large body of welfare supervisors, the Ministry of Munitions encountered great difficulty in building up their welfare department. It has now become, however, the greatest organisation of the kind in any country; and besides providing for the Government factories, the department has been able to render assistance to private firms. Public traction undertakings were among the few businesses that could lay claim to possessing any experience of welfare work, and when they were obliged to avail themselves of the services of many thousands of women the knowledge possessed by their managers facilitated the extension of the work among the women employees. In a number of instances the wife of the manager has taken an unobtrusive and valuable part in making the arrangements, giving place later to a paid supervisor as a member of the manager's staff. No undertaking has risen more thoroughly to its obligations than the London General Omnibus Company, the management of which were faced by exceptional difficulties arising from the great area served by their vehicles. In Liverpool, Sheffield, and numerous other towns much has been done by the managers and members of the tramways committees. In another column will be seen a report that shows how well the Committee and manager of the Birmingham Tramways have realised their responsibilities to the 1,500 women engaged thereon. Many of them have been attracted to the work from places outside of the city, and, as Councillor Harrison Barrow remarked, their lodgings are more or less uncomfortable. With their eight hours' period of duty spread over twelve or fourteen hours, they have had either to spend their rest period in the mess-rooms at the depots or wander about the streets. Now that they have been provided with an admirably appointed club, the enjoyment of its comforts should serve to mitigate the trying nature of their employment. A commendable feature is that the management is to be in the hands of an elected committee of the women and the two welfare supervisors. This will meet one of the leading criticisms of welfare work that was put forward at a conference of Industrial Women's Organisations held in London early in the past summer—namely, that the workers were "fed up" with people doing things for them; they wanted to act for themselves. The good supervisor, it was contended, was doing too much for the worker and robbing her, though unintentionally, of her independence. Less regard may be paid to an assertion that the position of a welfare worker is anomalous, in that she is appointed by the employer and is responsible to him. Without the interest of the employer there would be little or no welfare work.

COAL CONTROLLER AND TRAMWAYS

A memorandum has been issued by the Coal Controller giving suggestions for effecting economy in coal consumption. The use of locally produced coke or coke breeze is recommended as much as possible in public utility plants for light loads. Regarding public services, the Controller suggests the curtailment of early and late tramway running, after consultation with the Ministry of Munitions and the Ministry of Labour, where munition and other workers are likely to be affected. On the question of emergency disconnection, it is suggested that application be made to the Board of Trade by electric supply authorities for sanction to disconnect non-essential consumers in cases of urgent necessity. Arrangements should be made with neighbouring towns to interconnect electric distribution systems or generating plants by means of underground cables, or, in suitable cases, of temporary overhead wires over the intervening country, so as to enable one or two of the most economical stations in each district to supply several towns at light loads, instead of each town having to run its own power station uneconomically. This would also enable stations to shut down in turn during week-ends and holidays to effect repairs, and would provide power at call as a stand-by in case of coal supplies giving out locally.

Leeds Corporation officials in charge of departments using coal have met in conference with Mr. T. Roles, city electrical engineer of Bradford, and Yorkshire District representative of the Coal Controller, and discussed schemes for a reduction in the use of coal on lines suggested in the memorandum.

Mr. J. Christie, electrical engineer to Brighton Corporation, has been invited by the Coal Controller to act as honorary adviser in the effort to secure reduced fuel consumption in stations comprised in the South Coast area.

Successful Fares Revision at Croydon.—Mr. T. B. Goodyer, manager of Croydon Corporation tramways, has presented to the Council a report on the financial working of the new fare stages, comparing the traffic receipts and passengers carried for the year ended August 12, 1917, with the previous four years. The increase in the figures for the year ended August 12, 1917, compared with the average figures for the four preceding years, is as follows :—

	Increase.	Per cent.
Gross receipts	£11,728	13·33
Receipts per car mile	3·01d.	37·72
Number of passengers	928,416	4·67
Average fare per passenger	·088d.	8·28

In the special report submitted to the Council on July 3, 1916, it was estimated that the revised charges would produce an increase in gross revenue of at least 8 per cent. The annual increase of 13·33 per cent., as set out above, is a result which the Council will no doubt regard as thoroughly satisfactory.

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EMPLOYEES' DEMANDS.

STRIKE OF NOTTS. AND DERBYSHIRE COMPANY'S CAR HANDS.

Fifty men and women employed on the Nottingham-Ripley service of the Notts. and Derbyshire Tramways Co. refused to take out the cars on September 26. By using inspectors as motormen and conductors, the management kept four of the nine cars at work on this section, including the early cars for miners and munition workers. The employees demanded an increase of one penny per hour in wages, as distinct from the bonus which they accepted on the advice of their union, when they applied for an increase of twopence per hour a short time ago.

On September 28 the manager met the employees and offered to submit their application to the Committee on Production, but they refused the offer. At a public meeting held in Eastwood Market Place in the evening it was stated that a motorman who had been dismissed for insubordination had been reinstated, thus settling one of the reasons for which the strike was called. The secretary of the Nottingham branch of the Tramway and Vehicle Workers' Association stated that an offer of 9s. for males and 6s. for females per week had been made, as a war wage, in lieu of war bonus. That offer had been accepted on other sections of the system, and by the ruling of their union they would be compelled to resume work for the case to go to arbitration. Their wages were considerably under the rate operating in Nottingham, and their working conditions were harder. The meeting resolved to stand by the strikers until their demands are granted.

The question of the wages of the workers on tramway undertakings generally in Scotland will probably be brought up for consideration as a whole by the Amalgamated Association of Tramway and Vehicle Workers. This announcement is made by the Committee on Production in the preface to their award on the demand of the association, on behalf of Leith Corporation Tramway employees, for an increase in the existing bonus. The claim was that the bonus of drivers and conductors (men and women) be increased to 6s. 0d. per week, washers (men and women) to 5s., and shed labourers to 5s. The finding is that drivers and conductors (men and women) should receive an increase of pay of ½d. per hour; that the male shed labourers war bonus of 2s. be increased to 3s.; that female shed labourers receive an increase of wages of 1s. per week; and the washers (male and female) an increase of wages of 1s. 6d. per week. The amounts awarded are to be regarded as war advances, and are to be recognised as due to and dependent on the existence of the abnormal conditions now prevailing. The committee took into consideration the circumstance mentioned in the above announcement.

Newcastle Tramways Committee have decided that the war bonuses granted to the employees should in future be regarded as war wages.

The Committee on Production have awarded the employees of Doncaster Corporation an increase of 4s. per week for men and women over 18 years of age, and 2s. per week for those under 18. Women who come under the Munitions Acts are not affected by the award, but it is understood that their wages will be made up to 27s. per week. The demand was for an advance of 6s. per week all round.

WOMEN TRAMWAY WORKERS' CLUB.

An interesting ceremony took place in Birmingham on September 27, on the occasion of the opening by the Lady Mayoress (who was accompanied by the Lord Mayor, Alderman A. D. Brooks) of club rooms in Manchester Buildings provided by the Corporation for the use of the women tramway employees. The visitors, who were entertained to tea by the chairman of the Tramways Committee (Councillor Harrison Barrow), included members of the Tramways Committee, the town clerk (Mr. J. Beaumont Jones), the general manager (Mr. Alfred Baker), and the chief officers of the department, representatives of the conductresses' committee, and the department's two lady welfare workers, Miss L. Keep and Miss E. M. Wayland. Councillor Harrison Barrow drew attention to the considerations which had prompted his committee to provide the rooms. There were now 1,500 women employed, many of whom had been imported into the city, and a large number had to seek lodgings that were more or less uncomfortable. The hours of the girls were irregular, and although they did not ordinarily exceed eight per day, they were spread over twelve or fourteen hours. Thus a girl might be required at 5 a.m. for a 4-hour turn, and in the the evening for another four hours. The problem had been what to do during the remainder of the day. The married women, of course, generally found their spare hours in the middle of the day an advantage in looking after domestic affairs. With single women it was different, and a large number had been obliged either to stop in the mess rooms at the depots or to wander about the streets. It was to overcome this drawback that the committee had provided the club rooms. No effort had been spared to make the premises attractive and home-like. There was a large room where the girls would be able to meet and obtain suitable refreshments at reasonable prices. Newspapers, periodicals and games would be provided, and entertainments given. There was a second large room, which would be used principally as a rest and reading room, with easy chairs, couches, etc., and a small library was being formed. It was also felt very desirable that members should be able to sit down quietly to correspond with their friends. The management would be in the hands of a committtee of women elected by the employees. Miss Keep and Miss Wayland, two ladies employed to look after the welfare of the women, would act respectively as chairwoman and secretary. The catering would be undertaken by the head office. To ensure the club being run on good lines a panel of 50 girls would be formed. From this panel one or two girls would be selected as responsible officers for the day. It was desirable that the girls should feel that they themselves were taking a good share in the management, and in this way it was hoped that the best results might be obtained. The Lady Mayoress, in declaring the rooms open, paid an eloquent tribute to the accommodation provided, and complimented the women on the way they were endeavouring to carry out men's work. She was glad that it had been realised that women needed different treatment to men, and that the Tramways Committee had taken steps to meet the need. The aim of the committee had been to create a happy family feeling. The best way in which the girls could show their gratitude would be by cultivating this spirit, and by trying to be noble-minded and endeavouring to smooth their personal troubles.

MISCELLANEOUS NEWS AND NOTES.

Municipal Tramways Association.—All correspondence for this Association should now be addressed to Mr. A. R. Fearnley, honorary secretary, Division Street, Sheffield. The telegraphic address is "Tramways, Sheffield," and the telephone number 4600.

Cheap Tickets Abolished at Doncaster.—All workmen's dinner tickets and other cheap return tickets will be abolished by Doncaster Corporation. Owing to increased expenses it has been found impracticable to continue these concessions.

London School of Economics.—Owing to unforeseen circumstances, Sir George Gibb will be unable to deliver the opening lecture at the London School of Economics, on "Science of Transportation," on Wednesday, October 10, as previously announced.

Trolley Arm Mishap.—Whilst a car was proceeding through Brentford on September 30, the trolley arm was torn out of its pillar. It struck a man who was thrown the length of the top deck; he was taken to hospital for treatment of serious injuries.

An Increased Workmen's Service is being demanded at Newcastle-on-Tyne, despite the fact that the cars serving the shipyards and munition works are more numerous than before the war. The Tramways Committee have referred the question to a sub-committee and the general manager.

Traffic Rush.—During the week many thousands of people in the Metropolis have ceased work at an early hour, thus placing great strain on all the traffic undertakings. The management and employees have responded to the demand in a manner that is deserving of great praise.

London to Watford Electric Train Service.—Certain alterations were made on October 1 by the London and North-Western Railway Company. Among these is the withdrawal of a few of the steam trains serving Watford and the intervening stations.

Disabled Soldier Employees.—A West Ham tramway employee has been discharged from the Army minus one arm, thus rendering him incapable of performing his old work. There is no other place which could be offered to him. The Council have agreed to consider what principle shall be adopted in such cases.

Damage to Passengers' Dresses.—Complaints have been made of ladies dresses being cut while they were passengers on the Glasgow tramway cars. A man was charged at the police court on September 28 with maliciously cutting and damaging the dresses of twenty ladies, but the Sheriff found the charges not proven.

Improved Lighting at Gateshead.—The police are allowing Gateshead Tramway Co. to erect shaded electric lamps at junctions as a measure of safety. Last winter after the imposition of the restricted lighting the company were allowed to place similar lights at starting-places and at the approach to the high-level bridge.

Successful Queues at Halifax.—Mr. J. D. Caird's introduction of queues at Halifax tramway termini has resulted in advantage to the public and tramway staff. The successful working has attracted the attention of Brighouse Corporation, who have asked the chief constable to obtain particulars with a view to adopting the system in that town.

Motorman's Duty to Look Ahead.—In a summons against a London County Council motorman, who was fined at North London Police Court for driving to the public danger, the police stated that his car collided with a van, breaking a shaft and bruising the driver. Defendant pleaded that he had turned his head to look at a woman near a request stop.

Importance of a Uniform.—In fining a coaltrimmer 20s. for assaulting a tramway official who tried to open the gate of a car which was full, the Cardiff magistrates expressed the opinion that anybody appointed to regulate the car traffic ought to be in uniform. The complainant admitted that he was not in uniform, but said he explained to defendant that he was a person in authority.

Repair of Leased Electrical Equipment.—Swansea Council have referred back to the Tramways Committee a proposal that in the projected new lease of the tramways the company shall pay the fixed annual rents agreed upon between the borough treasurer and Mr. Tegetmeier, the chairman of the Company, and that the company shall repair and maintain the whole of the electrical equipment.

Newcastle Rating Appeal.—The Tramways Committee has issued another report relative to the assessment of the undertaking for the poor rate. The Assessment Committee had consented to reduce the assessment for the past three years to which the Corporation had objected, but the rates had not been amended, and the Tramways Committee as a last resource has appealed to the Quarter Sessions, and the hearing was to take place yesterday.

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The Avon India Rubber Company, Ltd., now have a new Birmingham address—Broad Street Chambers.

Automobile Engineers.—The first meeting of the session of the Institution of Automobile Engineers will be held on Wednesday, October 10, 1917, at the Royal Society of Arts, John Street, Adelphi, at 8 p.m., when Lieut.-Colonel R. K. Bagnall-Wild will deliver his presidential address. Cards of invitation to the meeting may be had on application to the Secretary of the Institution, 28, Victoria Street, London, S.W.

Traffic on the Woolwich Tramways.—Between July, 1914, and July, 1917, the number of tramcars arriving at Woolwich has increased 75·25 per cent., and the service during the maximum rush has increased by 170 per cent. The carrying capacity of the cars running into Beresford Square is 17,327 passengers per hour, the maximum number of cars arriving at Woolwich in an hour having increased from 76 in July, 1914, to 205.

Rosyth Tramway Construction Strike.—Work on the construction of the Dunfermline and Rosyth tramways was delayed at the end of last week by a strike of labourers, owing to the withdrawal of the hour's travelling time hitherto allowed each day. To atone for this, the contractors, Messrs. Balfour, Beatty and Co., increased the war bonus from 5s. to 8s., the wages remaining at 8¾d. per hour. The contract with the Admiralty provides for the completion of the work in March next.

A Motorman's Fingers.—A discharged soldier was the motorman of a South Shields tramcar which accidentally knocked down a boy. At the inquest which followed the lad's death from the injuries received, his father asked the motorman if he had all his fingers. The coroner remarked that he did not suppose the question was of importance. The driver pulled the car up in half its length at a speed of six miles per hour. If he had lost his fingers they were sorry for him, but he did his duty.

Blackpool Tramways Improvements.—The Tramways Committee, on the recommendation of the General Manager, Mr. C. Furness, has authorised the provision of new crossovers from west to east on the lines immediately opposite the north pier. During the coming winter the track between the Hippodrome and Abingdon Street will be doubled. An ornamental shelter is to be erected at the junction of Abingdon Street and Church Street, and a combined tramway shelter and bureau, with clock tower, opposite Foxall Square.

Transfer and Workmen's Fare Restrictions.—In accordance with the decision arrived at by the London County Council in July last, the Tramways Department on October 3 brought into operation the following alterations in regard to workmen's fares and transfer tickets: (*a*) Workmen's return tickets will be valid for return journeys only over the section for which the tickets are issued. (*b*) Transfer tickets will only be issued where there is no direct service and will be available for change of cars only at specified points.

Development of Canal Traffic.—The Canal Control Committee have issued an announcement urging upon manufacturers and merchants to use the waterways as much as possible in order to relieve the present heavy burden on the railways. The Committee has arranged northern, midland and southern district sub-committees, each consisting of representatives of the canal companies and carriers, with official representatives of the War Office, Ministry of Munitions, and the Railway Executive Committee, each with an independent chairman.

Demonstration of Coal Gas for Traction.—On Wednesday, October 10, a demonstration of vehicles, converted so as to be driven by either petrol or coal gas, will be held at the new commercial vehicle repair depot of Messrs. J. I. Thornycroft and Company, Pulford Street, Grosvenor Road, London, S.W. The exhibition has been arranged by the *Commercial Motor*, and a representative collection of converted motor vehicles is promised. Admission is to be by ticket, and our contemporary asks that everyone should attend at 2.15 p.m., as some of the vehicles must be freed early.

Through Route From Leeds to Liverpool.—With a view to securing a possible joining up between Halifax tramway terminus at Hebden Bridge and the Todmorden motor omnibus terminus at Sandbed, the Hebden Bridge Council have invited Halifax Corporation, Halifax Rural Council and Todmorden Corporation to appoint representatives to attend a conference. The length of road on which it is proposed to construct the link is about one and a half miles. If the tramway is constructed there would be a continuous route between Leeds, Bradford and Liverpool. The missing link has caused great inconvenience this summer to holiday people using the road instead of the railways.

Fares and the Decimal System.—Lord Belhaven and Stenton, President, and Mr. T. McKenna, Chairman, the Decimal Association, write from Finsbury Court, E.C., pointing out that the war has changed the value of the penny, as shown by many instances of halfpenny prices being raised to a penny, and of penny goods being raised to three halfpence. These advances of 100 per cent. and 50 per cent. respectively have been made when perhaps 20 per cent. would have reimbursed the sellers for increased cost. If the Association can provide the desired relief and reap the benefits of decimal coinage, the writers urge that it will have done something to merit the gratitude of the country. Most coins down to and including the sixpenny-piece are available and suitable for incorporation in a decimal system without any alteration of their values. Efforts to divide the florin into one hundred parts have hitherto been beset with insurmountable difficulties, largely because the change involved a slight reduction in the face values of the penny, halfpenny, and farthing.

London Electric Railway Employees' Demands.—In co-operation with the London District Council of the National Union of Railwaymen, a programme has been drawn up by the London Electric Railway Workers' Committee which includes demands for a 36-hour week; a guaranteed day and guaranteed week; minimum rate of 10s. per day, one flat rate for each grade; double time for night work, overtime, Sundays and Bank Holidays; 21 days holiday annually, with pay; nationalisation of railways, with both local and national representation; abolition of all hybrid grades, tonnage bonus and piece-work rates.

Trousers and Skirt-Coat Costume.—A trousers and skirt-coat uniform is to be supplied to the women conductors on the Newcastle tramways. It is on the lines of the uniform worn by women in munition factories and has been successfully introduced on the cars in other towns. Its chief advantages are that it offers less impediment to the wearer when climbing staircases, and that it averts the risk attendant upon exposure to wet on cars that are not top-covered. For all-round efficiency the short skirt and long leggings of the London General omnibus conductors cannot be surpassed. A waterproof is provided for wet weather wear.

Lancashire Tramways Award.—The award of the Committee on Production in the arbitration held last week in London between nineteen Lancashire and Cheshire tramways and their employees gives another substantial increase of war wages to the 20,000 tramway workers affected. The whole of the workers, male and female, over 18 years of age will receive an advance of 3s. for a six days' week, and those under 18, 1s. 6d. The total war advance for a six days' week is now 12s. for men, 9s. for women, 5s. 6d. for boys under 18, and 4s. 6d. for girls under 18. Under the award the bonus is payable for overtime as well as for the ordinary working week. The award takes effect from the first pay day in September. This will involve a large extra charge upon the undertakings, and will probably necessitate a general increase in tramway fares in the districts concerned.

Repairing Staff Shortage.—A minister at Featherstone, on the authority of a Bradford Councillor, attributed to the tramways manager a statement that it was only by crowding that the cars could be made to pay under the present circumstances. As a matter of fact, the crowding is due to a shortage of cars, the operation of the Military Service Act having reduced the staff of the repairing and building shops so much that it is impossible to keep sufficient cars in service. Traffic has also greatly increased, the weekly receipts being about £1,000 in excess of those for 1916. A similar state of things prevails at Leeds and all towns in which war work is carried on. The weekly earnings at Leeds exceed the figures for last year by about £1,250 per week. It is to be hoped that the lack of hands in the shops will not be accentuated by the men seeking other employment now that leaving certificates are to be abolished.

PERSONAL.

Mr. H. Barson has been appointed chief charge engineer at the Dover Corporation Electricity Works, succeeding Mr. A. H. Jones, resigned.

Mr. T. W. Hibbert has been appointed acting borough electrical engineer at Barnsley during the absence at the front of Captain Barker, who has held that position for several years.

Mr. L. E. Harvey, Manager of Ilford tramways, has been granted permission to attend the meetings of the sub-committee on standardisation of overhead equipment of the Municipal Tramways Association. Mr. Harvey is the only member of the sub-committee in the South of England.

Mr. C. W. Mallins, general manager of the Liverpool Corporation tramways, has been granted an increase in salary from £1,250 to £1,500 per annum.

Cardiff City Engineership.—The special committee appointed to select candidates to recommend for appointment as city engineer, rendered vacant by the death of Mr. W. Harpur, have sent a deputation to visit the boroughs now served by Mr. S. E. Burgess, Middlesbrough; Mr. E. J. Elford, Southend; Mr. F. Wilkinson, Deptford; Mr. F. Wood, Fulham; Mr. J. Lord, Halifax; and Mr. E. Morgan, Bolton.

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Mr. J. Christie, electrical engineer and manager of Brighton Corporation, has been asked by the Coal Control department to act as electrical adviser in connection with the consumption of fuel in electric power stations in the South of England.

Bairnsfather's "Old Bill."—The tramway workers at Birmingham claim that the original of the "Old Bill" of Capt. Bairnsfather's Western Front sketches was Mr. Norman Pat Rafferty, who worked on the Handsworth route. The identification was made by the recent publication of his photograph in a newspaper. Rafferty was a Reservist of the Royal Warwickshire Regiment, and he was killed in Flanders.

Mr. D. M'Dowall Grosart, J.P., manager and engineer of the Dublin and Lucan Electric Railway Company, has been presented with a gold watch and cheque by the shareholders of the company and the users of the line, in appreciation of his services in getting the line placed under Government control. It appeared at one time as if the undertaking would be closed, but owing largely to Mr. Grosart's persistence this step was avoided.

Will of Sir George White.—Probate of the will of the late Sir George White, Bart., late chairman of Bristol Tramways and Carriage Co., and founder of the first aeroplane factory in this country, has been granted to his only son, Sir Stanley White, Bart. The will, which is dated July 15, 1916, provides for the division of the whole of the deceased's unsettled property in certain proportions between his son and only daughter, Mrs. Ernest J. Hudson. Probate has been taken out upon a gross sum (exclusive of the value of property settled or transferred in the lifetime of the deceased) of £185,000, with net personalty of £137,000.

The death is reported from wounds on September 30, resulting from an engagement on September 28, of **Lieut.-Colonel R. W. Hammond,** Royal Fusiliers. He was the only son of the late Mr. Robert Hammond, with whom he had been in partnership for some years at 64, Victoria Street, S.W.

FINANCIAL REPORTS AND MEETINGS.

Kalgoorlie Electric Lighting and Power Corporation.—A dividend has been declared on the preference shares at the rate of 4 per cent. per annum for six months.

Northern General Transport Company.—The board announces an interim dividend at the rate of 5 per cent. per annum (6d. per share) on ordinary shares for the past half-year.

Fraser and Chalmers Ltd.—The directors, with the sanction of the Treasury, have invited application for 100,000 six per cent. first mortgage debentures of £100 each at £93.

Callender's Cable and Construction Company, Ltd., have declared an interim dividend at the rate of 10 per cent. per annum on the ordinary shares for the half-year. The rate is the same as a year ago.

Shanghai Electric Construction.—The directors of the Shanghai Electric Construction Company announce an interim dividend at the rate of 5 per cent. actual (10s. per share), less tax, in respect of the year 1917.

Interborough Rapid Transit Company.—Traffic receipts for the year ended June 30 were $39,866,146, and expenses $16,583,293. Other receipts were $6,559,076. A dividend of 20 per cent. is proposed carrying forward $2,102,654 dol.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended October 3 amounted to £52,498, an increase of £2,283 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to October 3 (twenty-six and a half weeks) the total receipts were £1,489,804, an increase of £187,798 on the corresponding period of 1916.

Manaos Tramways and Light Company.—The net profits for the year ended April 30 were £6,628, after providing for debenture interest. It is proposed to add to contingencies reserve £3,000 (making a total of £26,725) and to renewals reserve £3,000 (making £30,000), and to carry forward £628. The economic conditions in the Amazon Valley did not compare unfavourably with those which obtained during the preceding year, and the result indicates a gradual return of prosperity to this district. Brazilian exchange improved slightly in the course of the year. The loss on remittances from Manaos was £12,231 against £13,093.

West Ham Tramways Estimate; no Increase of Fares.—In his estimate of the results of the current year's working, Mr. Slattery, general manager, West Ham Corporation Tramways, has reported that the receipts would, from August 1, increase by £300 a week, and that the cost of material would not increase by more than 10 per cent. on existing prices. On this basis he estimated the revenue to be £182,604, an increase of £16,292 over last year, and the expenditure at £197,711, an increase of £6,871, showing a deficiency, exclusive of allowances to men on active service (which was estimated at £18,500) of £15,107. The wages concessions granted since the beginning of the current financial year amounted to approximately £6,982, and to this must be added the balance of concessions granted during the financial year 1916-17, amounting to £2,392, making a total increase of £9,374 over the wages bill of last year, which was wholly attributable to war conditions. Having regard to the extraneous items of expenditure, which fully account for the loss, he cannot recommend increasing or revising the fares, but he urged that there should not be any differentiation fares or free travelling. The Council have adopted the report, as also the report of the electrical engineer on the electricity undertaking. The deficit here is estimated at £33,500 for the year, provision for which is to be made in the rate.

CONTRACTS AND ORDERS.

Accrington Electricity and Tramways Committee have placed an order with George Hargreaves and Company for 500 tons of coal per month for a year at existing prices, subject to any alteration made by the Coal Controller.

Ilford Council has accepted the following tenders:— General Electric Company, Ltd., converting plant, £2,459; W. T. Henley's Telegraph Works Company, Ltd., cables, £1,432; Albion Clay Company, Ltd., conduits, £526.

Manchester Electricity Committee has accepted tenders from Callender's Cable and Construction Company, Ltd., W. T. Henley's Telegraph Works Company, Ltd., C. Macintosh and Company, Ltd., and the British Insulated and Helsby Cables, Ltd., for the supply of cable.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-nine of the principal tramway undertakings in the United Kingdom for the week ended September 22 give total receipts of £202,071, or £22,907 more than in the corresponding week of last year. The total length of track included in the returns was 2,058 miles.

The receipts this year were at the rate of £98 3s. 9d. per mile of single track, and last year at the rate of £87 1s. 2d., thus showing an increase for the week of £11 2s. 7d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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IN RELATION TO

LOCAL AUTHORITIES,

BY

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City Treasurer of Bradford, and

WILLIAM WHITTINGHAM,

City Treasurer's Office, Bradford.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH OCT. 4, or previous.	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	73	73
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	65/-	65/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69½	69½
4½%	4½%	Do. 4½% Deb.	100	98½	73¾	72⅞
5%	5%	Do. 5% Deb.	100	96	67	67½
—	—	Associated Omnibus Co., Ord. ..	5/-	31/32	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 3/32	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	103	103
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	3/6	3/3
6d.	6d.	Do. 5% Cum. Pref. ..	1	15/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72⅝	71⅞	71⅞
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19⅛	19⅛
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11¾	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	76	76
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88	88
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	45⅞	46⅛
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	91½	91½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	25	27½
5%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	38	43½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96⅛	53¼	53¼
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	29	29
6%	6%	Do. 6% Cum. Part. Pref.	100	—	72½	72½
5%	5%	Do. 5% Deb.	100	92	77⅛	77⅛
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6 15/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71½	71½
1/-*	1/-*	Cape Elec. Trams.	1	13/16	11/-	11/-
1/3	1/3	City of B. A. Trams	5	5½	85/-	85/-
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82	82
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10 5/16	10⅞
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2⅜*	1/2⅜*	Do. 6% Cum. Pref. ..	1	1/16	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	7/16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	3/8	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 31/32	9 31/32
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	3/64	1/3	1/3
6d.	6d.	Do. 5% Pref.	1	1/64	5/3	5/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61⅞	61⅞
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81⅜	81⅜
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	79
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	32½	33
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7¾d.%	9¾d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
5%	$1½	Manila Elec. R. R. & Light ..	$100	102	64	63½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	72
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33	33
—	—	Do. 1 Mt. 5% G.B. ..	—	84	42½	42½
—	—	Do. 6% Mt. Bds. ..	100	76	40½	40½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2⅜*	2/-	National Steam Car	1	15/16	19/3	20/-
9¾d.*	9¾d.*	New General Traction	1	⅜	7/3	7/3
8¾d.	6d.	Northern Gen. Trans. Ord. ..	1	3/32	13/3½	13/3½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	75/-	75/-
5%	5%	Do. 5% 1st Deb. ..	100	89½	76	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/3	7/3
—	—	Do. 7% Non. Cm. Part Pf.	1	—	13/3	13/3
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7¾d.*	8¾d.*	Potteries Elec. Trac. Ord. ..	1	1/32	6/3	6/3
6d.	6d.	Do. 5% Pref.	1	3/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	¼	19/3	19/3
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	87½	86¾
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	78¾	79¼
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/-	12/-	Shanghai Elec. Cons.	10	13	14½	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/6	18/6
3/-	3/-	Do. 6% Cum. Pref. ..	5	¾	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21¾	16⅛	16½
—	—	Undgd. Elec. Rys. of London ..	10	21⅛	38/1½	33/9
		Do. "A"	1/-	¾	6/3	5/10½
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	101½	102
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	101½	100½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	82½	82½

*Indicates dividend for the year. In other cases the dividend is for the half-year

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Sept 22	430	441	+ 11	25	11,210	+ 1,025
Aberdeen Corporation ..	,, 26	2,025	2,216	+ 191	17	38,190	+ 4,433
Ayr Corporation ..	,, 29	438	526	+ 87	20	11,629	+ 912
Belfast City	,, 28	5,883	6,609	+ 726	26	163,349	+ 15,774
Birkenhead Corporation	,, 30	1,671	1,982	+ 311	26½	48,471	+ 7,490
Birmingham Corporation	,, 22	16,388	19,206	+ 2,818	25	451,068	+ 34,865
do. Motor Omnibuses ..	,, 22	960	1,187	+ 227	25	25,015	— 244
Blackburn Corporation ..	,, 26	1,386	1,493	+ 107	26½	40,836	+ 5,916
Blackpool & Fleetwood ..	,, 22	1,268	1,535	+ 267	37	36,324	— 128
Bolton Corporation ..	July 29	3,083	3,391	+ 308	17	56,558	+ 6,036
Bournemouth Corporation	Oct. 3	2,337	2,973	+ 636	26½	71,648	+ 4,778
Bradford Corporation ..	Sept. 29	7,078	7,940	+ 862	26	202,664	+ 18,091
Brighton Corporation ..	Aug. 19	1,942	2,216	+ 274	20½	30,826	+ 4,084
Bristol	Sept. 28	5,419	6,123	+ 704	39	211,363	+ 19,403
Burnley Corporation ..	,, 26	1,765	1,966	+ 201	..	..	..
Burton-on-Trent Cor. ..	,, 30	293	329	+ 36	26	8,046	+ 734
Bury Corporation ..	,, 30	1,726	1,738	+ 12	26½	44,839	+ 5,291
Chatham & District ..	,, 27	1,381	1,299	— 82	39	50,872	+ 2,687
Cork Electric	,, 27	542	598	+ 56	39	21,362	+ 1,377
Derby Corporation ..	,, 29	1,163	1,259	+ 96	26	31,667	+ 1,158
Dublin United	,, 28	6,682	7,040	+ 358	39	260,814	+ 25,530
Dundee City	,, 26	1,393	1,576	+ 183	19½	30,192	+ 2,736
East Ham Corporation ..	,, 29	1,398	1,324	+ 74	26	37,569	+ 2,562
Exeter Corporation ..	,, 28	445	433	— 12	26	10,860	— 33
Glasgow Corporation ..	,, 29	24,543	27,394	+ 2,851	17⅞	458,164	+ 54,059
Glossop (U.E. Sup. Co.) ..	,, 29	162	178	+ 16	39	5,913	+ 495
Halifax Corporation ..	,, 25	2,341	2,431	+ 90	25⅞	65,962	+ 5,019
do. Motor Buses ..	,, 25	52	54	+ 2	25⅞	1,239	— 66
Hastings and District ..	,, 30	1,267	1,608	+ 341	39	49,702	+ 7,387
Huddersfield Corporation	,, 29	3,117	3,449	+ 332	26	87,403	+ 7,827
Hull Corporation ..	,, 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	,, 29	689	739	+ 50	26	20,578	+ 2,164
Ipswich Corporation ..	,, 29	561	726	+ 165	26	18,718	+ 4,038
Isle of Thanet	,, 29	436	240	— 196	52	16,317	— 3,459
Kilmarnock Corporation	,, 29	181	207	+ 26	19½	3,871	+ 326
Lanarkshire	,, 27	2,659	3,177	+ 518	39	107,118	+ 16,840
Lancashire United ..	,, 26	2,189	2,335	+ 146	39	90,910	+ 20,075
Leeds City	,, 29	10,310	11,326	+ 1,016	26	290,088	+ 29,329
Leicester Corporation ..	,, 29	3,794	3,941	+ 147	..	..	..
Leith Corporation ..	,, 29	909	1,113	+ 204	19½	21,604	+ 3,820
Leyton U.D. Council ..	,, 27	1,889	1,900	+ 11	26	50,448	+ 5,228
Liverpool Corporation ..	,, 15	14,367	16,757	+ 2,390	36⅔	568,881	+ 49,794
Llandudno & Colwyn Bay	,, 21	546	560	+ 14	42½	15,153	— 961
London County Council	Oct. 3	50,215	52,498	+ 2,283	26½	1,489,804	+ 187,798
Maidstone Corporation ..	Sept. 27	248	269	+ 21	26	6,565	+ 638
Manchester Corporation	,, 29	19,765	21,274	+ 1,509	26	537,327	+ 39,898
Nelson Corporation ..	,, 29	237	253	+ 16	26	6,244	+ 443
Newcastle-on-Tyne Cor.	,, 29	7,117	8,142	+ 1,025	26	203,370	+ 29,640
New St. Helens & Dist. ..	,, 26	1,111	1,343	+ 232	13	21,086	+ 5,931
Northampton Cor. ..	,, 28	731	986	+ 255	26	21,820	+ 3,033
Nottingham Corporation	,, 27	4,592	4,592	nil	26	113,938	+ 10,554
Oldham Corporation ..	,, 30	2,498	2,948	+ 450	27	77,835	+ 8,504
Portsmouth Corporation	,, 29	2,884	3,282	+ 398	..	..	..
Provincial	,, 29	2,591	2,813	+ 222	52	122,038	+ 1,379
Reading Corporation ..	,, 27	924	1,132	+ 208	25⅔	27,199	+ 4,602
Rhondda Tramways ..	,, 20	1,412	1,661	+ 249	38	56,311	+ 7,907
Rochdale Corporation ..	Aug. 4	1,927	2,373	+ 446	18	38,283	+ 4,656
Rotherham Corporation	Oct. 3	1,625	1,906	+ 281	26½	47,807	+ 6,410
Salford Corporation ..	,, 1	5,800	6,896	+ 1,096	26⅔	175,638	+ 27,927
Sheffield Corporation ..	Sept. 30	11,505	12,672	+ 1,167	27	323,012	+ 36,803
Southampton Cor. ..	,, 26	1,721	2,243	+ 521	25⅓	52,217	+ 8,233
Southend-on-Sea Cor. ..	,, 19	1,054	916	— 137	25	26,825	+ 94
South Shields Cor. ..	,, 22	864	990	+ 126	25	24,226	+ 2,800
Sunderland Corporation.	,, 30	1,603	1,851	+ 248	26	47,939	+ 4,040
Sunderland District ..	,, 26	698	775	+ 77	48	34,300	+ 4,846
Swindon Corporation	,, 26	220	288	+ 68	25¼	7,101	+ 1,723
Torquay Tramways ..	,, 20	1,412	1,661	+ 249	38	56,311	+ 7,907
Tyneside Trys. & Trmrds.	,, 19	654	955	+ 301	12	11,586	+ 2,887
Wallasey Corporation ..	,, 29	1,435	1,563	+ 128	26½	43,347	+ 4,900
Walsall Corporation ..	,, 29	869	999	+ 130	26	25,398	+ 3,101
Walthamstow U.D. Coun.	,, 29	1,308	1,218	— 90	26	33,799	+ 3,635
Warrington Corporation	,, 20	506	584	+ 78	25	13,309	+ 1,014
West Ham Corporation ..	,, 27	3,666	3,744	+ 78	25⅔	96,715	+ 11,078
Wigan Corporation ..	,, 28	1,781	2,003	+ 222	26	50,912	+ 6,820
Yorkshire (West Riding)	,, 30	1,915	2,261	+ 346	39	82,565	+ 13,849

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Sept. 30	£50,947	£53,126	39	£2,002,660	+ £24,827
Auckland .. (4 weeks)	Aug. 24	20,467	21,812	38	42,722	+ 748
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Aug.	7,405,000	8,064,000	34	60,505,000	+ 4,492,000
Brisbane	Aug.	37,900	36,925	34	263,240	— 1,890
British Columbia .. $	July	411,847	438,378	4	438,378	+ 26,531
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Aug.	24,413	26,714	4	26,714	+ 2,301
Calcutta .. .. Rs.	Sept. 29	72,605	72,180	39	2,662,235	+ 22,369
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Sept.	1,779	4,306	39	38,405	+ 15,805
Cordoba	July	14,258	14,343	18	56,154	— 1,165
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Aug.	2,522	1,562	4	1,562	— 960
Hong Kong .. .. $	Aug. 18	18,023	12,774	33	442,008	— 34,682
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Aug.	3,793	4,076	34	33,095	— 532
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	July	..	237,832	..	..	..
Madras .. .. Rs.	Sept. 30	31,788	34,219	38	624,412	+ 54,626
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	June	144,913	165,693	..	..	..
Montevideo	Sept.	26,711	29,426	48	329,679	+ 10,636
Pernambuco	Sept. 30	3,094	4,061	38	146,072	+ 28,504
Peruvian .. .. $	Aug.	895,900	979,430	8	1,954,430	+ 223,100
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Sept.	4,137	5,163	39	44,354	+ 3,026
Shanghai .. .. $	July 11	21,375	23,308	..	..	..
Singapore .. .. $	Aug. 11	13,711	12,907	32	415,039	+ 15,731
Toronto .. .. $	July	867,789	954,192	30	6,827,776	+ 624,788
Winnipeg .. .. $	July	242,688	242,797	30	1,916,197	— 27,995

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Leeds City Tramways
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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

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WEEKLY LIST OF TENDERS INVITED.

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Canvas	8
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Colours, etc. (ground in oil and dry), and Hall's Distemper, Wall Paper, etc.	12
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Electric Light Carbons	16
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Gas Mantles	21
Gauges, Steam and Vacuum Brake	22
Glass	23
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Forms of Tender can be obtained from the Secretary on payment of One Shilling for each form. Please do not send stamps.

Tenders must be for the supply of Goods in accordance with the Company's patterns; these patterns may be seen at the General Stores Depôt, Dundalk (they cannot be sent away for inspection), between the hours of 10 a.m. and 4 p.m. on each week day except Saturdays.

Tenders, made out on the Company's forms, should be delivered, under sealed cover, endorsed "Tender for Stores," to the undersigned, not later than 10 a.m. on November 1, 1917.

The Directors do not bind themselves to accept the lowest or any Tender.

T. MORRISON,
Secretary.

Secretary's Office,
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October 4, 1917.

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By Order,
PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax,
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SATURDAY, OCTOBER 13, 1917.

COAL GAS AS MOTOR FUEL.

As a war time expedient the use of coal gas for motor vehicles has been justified. It cannot be regarded as a new departure, for it can be traced back many years, the most notable experiment being that on the Blackpool and Lytham tramways in 1896. In the internal combustion engine field, too, marked success has been achieved with various types and sizes. It was in the early part of last year, however, when import difficulties, coupled with the rapidly increasing demands by the Services, caused such restrictions to be imposed on the use of petrol that the first steps were taken to experiment with gas for motor vehicles. Many difficulties had to be overcome, but, largely owing to the persistent advocacy of the *Commercial Motor* and the *Motor*, these were surmounted. Conclusive proof of the success of the innovation was seen at the demonstration of various types of vehicles, all using gas as fuel, which was held on Wednesday. The demonstration was organised by the journals already named, and its outstanding feature was the great variety of vehicles among the forty-three machines taking part. These ranged from a cycle fitted with a flexible container with 40 cubic feet capacity, to an omnibus seating forty passengers and fitted with a flexible container holding 800 cubic feet, built and loaned by the Bristol Tramways and Carriage Co. While the majority of the vehicles were of the parcel delivery type, with engines not exceeding 20 h.p., there were a few exceptions which demonstrated the fact that gas can be universally used. Amongst these were a 40 h.p. Thornycroft char-a-banc equipped to run 18 miles on one charge, a 3-ton Austin market wagon, a 3½-ton Napier covered van, a 3½-ton Wolseley, and two 2-ton Thornycroft lorries. These machines are in regular service, working entirely on gas, and judging from the ease with which each vehicle negotiated the steep gradient from the ground floor of Thornycroft's repair garage, where the exhibition was held, to the street, it was evident that ample power was available, although it is generally considered that coal gas is 15 per cent. below petrol in efficiency. Considered from the utility view it is obvious that gas in a flexible container at atmospheric pressure can only be regarded as an expedient, as the average mileage obtainable on one charge is not higher than 12 miles. With exceptionally large containers, as in the case of the Bristol omnibus, a run of 16 miles on one charge is possible, while in the case of the 40 h.p. Thornycroft char-a-bancs 18 miles has been arranged for. In these instances, however, the full length of a very long body has been utilised and the circumstances must be regarded as exceptional. On the other hand the facilities for re-charging are daily becoming greater throughout the country. All these steps facilitate what is of vital importance to the community, viz., quick transit for goods and passengers. Even with the heavy handicap which national exigencies have placed upon industry the position will not be allowed to remain as it is. Already we hear of experiments with containers constructed of proofed fabric suitable to withstand a pressure that would permit a container to be charged to many times its normal capacity, while metal containers are receiving attention. The difficulty in connection with the use of compressed gas lies in the fact that suitable compressing plant is not generally available and is practically unobtainable at present. This is a difficulty that will be overcome so soon as peace arrives. In the meantime the fundamental principle has been established that with minor adjustments the petrol engine can be operated efficiently with gas, thus enabling the country to conserve the supply of motor spirit for vital needs.

EMPLOYEES DEMANDS.

The Notts and Derbyshire Tramways Co. came to an agreement on October 5 with their employees who had left work, and the cars began running after a week's stoppage. The full demand of 1d. an hour increase was agreed to, the war bonus to remain in operation subject to a 54-hours week being worked and a reduction of one-sixth for each day not worked.

By means of voluntary workers the Birkenhead Tramways and Electricity Department have in part overcome a strike of stokers, engine-drivers and trimmers at the generating station. A reduced car service has been maintained. The trouble is due to the men's dissatisfaction with an arbitration award on a demand for 12s. a week increase in wages. The board gave 11s. to drivers, 10s. to stokers, and 8s. 2d. to trimmers. An additional 1d. per hour is now demanded. The chief industrial commissioner has stated that he expects the men to abide by the award.

At a meeting of Wallasey Council a member protested against the decision of the Tramways Committee in regard to the recent strike being posted in the sheds instead of being communicated to the secretary of the men's union. Councillor House, chairman of the Committee, defended their action, which was the ordinary way of notifying the workers on any matter.

The Municipal Employees' Association at Cardiff have threatened to call a strike of the tramway employees if the Wages Committee fail to consider a demand by the power station hands for an additional 6s. per week to bring their war bonus up to 15s. The matter was considered by the Wages Committee on October 10, when it was decided to recommend the Corporation to make no further increase of war bonus. The association have abandoned their intention to hand in their members notices to cease work, but will appeal for arbitration.

An award has been issued by the Board of Trade arbiter in the dispute between the Municipal Employees' Association and Glasgow Corporation. He finds it is reasonable that the remuneration of qualified male employees should be made equivalent to that of men directly affected by the April and August awards of the Committee on Production; and that the pay of females should be made equivalent to that fixed by Orders made by the Minister of Munitions regulating employment of women on munitions work.

Hull Tramways Committee have deferred until after the meeting of the Yorkshire Municipal Tramways Authorities at Leeds an application by the car employees for an increase of 7s. per week.

Newcastle Corporation have declined to be represented upon a joint Committee of Tyneside boroughs to deal with wages of employees. The Council hold the view that the Tramways and other Committees should deal with their own cases as they arose from time to time.

Walsall tramway employees have been granted increases in war bonus ranging from 1s. 6d. to 3s. per week. At Leith the motormen and conductors have been granted an extra halfpenny per hour.

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COMMITTEE ON GAS TRACTION.

Professor Cadman, director of the Petroleum Executive, stated on October 9 that Mr. W. Long, M.P., Controller of the Executive, is about to form a committee on Gas Traction, and that Mr. Shrapnell Smith, the Petrol Economy Officer, will concentrate on the use of coal gas as a substitute for petrol. The object of the Committee would be to co-ordinate and standardise the procedure to be adopted in the extended use of this fuel.

Mr. F. Thoresby has been appointed Investigation Officer to the Petroleum Executive. He is a barrister, and was until recently managing director of the Car and General Insurance Corporation.

The first motor cab to be run by gas power in Manchester has made its appearance, and it is stated that gas is four times cheaper than petrol at the present-day prices: 259 ft. to 300 ft. of gas, costing 1s., is said to be equal to a gallon of petrol, costing 4s.

As from October 10 motor spirit is reduced in price threepence per gallon, retail, and petroleum one penny per gallon wholesale. The lower prices are due solely to the reduction of the war risk insurances upon vessels and their cargoes.

REVISION OF FARES.

In connection with the decision of Manchester Corporation that the recent award by the Committee on Production should be dealt with by the various committees on uniform lines, Alderman Bowes, chairman of the Tramways Committee, informed the Council at their October meeting that the Committee would have to give consideration to an advance of fares. The recent award would increase the cost of skilled workmen by £78,780, and the war advance £11,130. The award of the tramway workers, given on September 27, would cost £27,040, and, with the award given on the same date to the workers' union of £1,956, made a total roughly of £119,086. There was also the higher cost of materials to be met.

Exeter Council have increased the fares by ½d. on several sections, and dinner hour return fares by ½d.

The Council rejected an amendment to delete the increase on dinner-hour return tickets, Councillor Varwell, the chairman, observing that he did not think one-tenth of the passengers would be affected by the alteration, although it would mean an addition of nearly £1,400 a year to the receipts. It was also decided that the increases should apply to soldiers in hospital uniform. Dogs taken on a car are to be charged for. Inside they are to be carried on the lap, and outside they are to be on leash. No large dogs will be allowed on the cars.

Doncaster Council have adopted their Tramways Committee's recommendation that workmen's cheap return and dinner and coupon tickets be abolished, owing to the increased cost of working. Councillor H. M. Marshall, chairman of the committee, stated that coal had advanced 60 per cent., wages by £1,800, and uniforms 40 per cent. The workman's cars to Hyde Park, Balby, and Hexthorpe ran five to seven miles for a penny, and two miles for nothing, and coupon tickets were equal to a discount of £1,022. An amendment to delete the recommendation was defeated by 20 votes to 8. Councillor Marshall's speech was described as one of the best ever heard in the council chamber. He pointed out that the revision was necessary in order to prevent the undertaking becoming a charge on the rates. It was unsound, he said, to argue that the cars should be subsidised by the ratepayers just to continue cheap fares to a class who were making more money than ever out of war conditions.

Many of the miners have resolved to boycott the cars of the South Lancashire Tramways Company in consequence of the increase of fares between Walkden and Farnworth, and Moses Gate and Swinton.

Ipswich Tramways Committee have agreed to increase the number of penny stages. Some months ago the maximum fare was fixed at 1½d. with the exception of the Cornhill to Station route.

Tribunal Decision Against Belfast Corporation.—Six electricians who had been employed on the overhead equipment of Belfast Corporation Tramways on October 1 were successful in a complaint which they brought before the General Munitions Tribunal against the Mayor and Corporation for having on August 23 and subsequent days, in contravention of section 2 of the Munitions of War Act, 1915, caused a lock-out in connection with a difference as to wages without giving 21 days' notice to the Board of Trade. It appeared from counsel's statement in a test case that a disagreement occurred when unskilled men were taken on to do the work of two or three electricians who joined the Army. As the result of the union's protest the man were paid the union rate of wages. Some time afterwards there was talk about the tramway finances, and the men were given notice, with liberty to apply for work as overhead wiremen at a reduced rate of pay. They contended that there was no justification for a reduction of wages on that work. For the Corporation, Mr. J. S. D. Moffat, the general manager, gave evidence that when he was appointed he found reorganisation necessary, and in consequence he served the notices dismissing about eight men. He served another notice on 22 men, but in this case he offered work of a different nature. Ten of the vacancies were filled. These ten men received trade union rates of pay on the same work as the men who were dismissed, including the six complainants. The Court unanimously decided that there was a lock-out, and a fine of 10s. on each summons was imposed, with 10 guineas costs in the test case.

MISCELLANEOUS NEWS AND NOTES.

New Siding at Plymouth.—The Tramways Committee propose to construct a new siding in St. Levan Road at an estimated cost of £475.

Boy Scouts as Conductors.—Walsall Tramways Committee has decided to accept the offer of the service of boy scouts to assist the conductors at the busy times.

Power Cost at Bournemouth.—Bournemouth Corporation has agreed to an increase of 22½ per cent. in the price paid to the Bournemouth and Poole Electricity Supply Company for electrical energy for the Corporation tramways.

Mansfield Light Railways.—An application has been made by the Mansfield and District Light Railway Company for an extension of time until April, 1921, for the completion of tramway extensions at Sutton-in-Ashfield and Skegby.

Traffic Pressure at York.—The month of August was the first month in which over one million passengers were carried on York Corporation Tramways and Omnibuses. Alderman Meyer, chairman of the committee, replying to a complaint as to delay in obtaining a new electric omnibus, has stated that the manager was doing his best to obtain the necessary spare parts. It was true that a petrol vehicle might be obtained, but at the present time the cost of running it would be unremunerative.

Glasgow Car Traffic.—Notwithstanding the manner in which the car service has been maintained in the face of great difficulties, there are demands for increased facilities of an evening on the Bothwell Stret route, and on western routes, *via* St. Vincent Street, at meal times. For the first four months of the financial year, the traffic receipts were £458,163, as against £404,105 in the corresponding period of last year. The passengers increased from 124,147,872 to 137,818,081.

Decimal Coinage and Fares.—Glasgow Tramways manager has presented a report dealing with a suggestion that the coinage should be decimalised. As bankers wish to retain the sovereign at its present value, the Decimal Association suggest a compromise which would affect only the coins below the value of a shilling. The shilling would represent tenpence, and in order to equalise the value it is proposed to increase the worth of the halfpenny and the penny by 20 per cent.

Carelessness on the Part of Motormen.—In one recent week two Oldham motormen were dismissed for carelessness, and the tramways department states that nowadays there is great deterioration in the material available for training. There were ten collisions with other vehicles in two weeks and five collisions between cars. In order to prevent drivers attaining too much speed and running past passengers, the manager has been empowered to fix a compulsory stop midway between the Black Horse Hotel and Royal Oak Hotel compulsory stops.

Car Traffic During Air Raids.—Undeserved criticism of the London County Council's Tramways Department has lately appeared in newspaper correspondence columns on account of the car employees being required to continue on duty during air raids. The blame, if any, rests with the military and the police. While the Zeppelin menace was at its height several East London tramway authorities proposed to discontinue their services on the appearance of the airships, but were compelled by the Horse Guards and Scotland Yard to obey the regulation, which is applicable to the tramways of the whole of the metropolis.

Swansea Tramways Rents.—The Tramways Committee have agreed to the annual rents payable by the Tramways Company being fixed at about £6,000 per year, the Corporation to retain their existing powers regarding repairs, etc. The agreement is to be embodied in the new lease to include the whole undertaking. Under the old agreement several sections had to be re-leased to the company right up to 1980 before the Corporation could exercise its power of purchase, but in 1911 the various periods were equated to one date (about 20 years' time). After the war the borough surveyor hopes to have his own plate-laying gang, in order to repair the permanent way of certain tramways at the company's expense.

Women Employees as Munition Workers.—A deputation representing the Municipal Tramways Association and the Tramways and Light Railways Association was received at the Ministry of Munitions on Friday in connection with the proposal that women and girls employed on tramways should be regarded as munition workers. When the wages of munition workers were raised, the employers were compensated by the Government, but if tramways employees are reckoned as munition workers the tramway undertakings will have to pay the increase without Government assistance. There are sufficient reasons why women tramways workers should not be placed on the same status as men, and if they were so placed, the consequent charges on many tramway undertakings will render their financial position precarious.

Goods Haulage on Dundee Tramways.—At a recent meeting of the Dundee Tramways Committee, Mr. Peter Fisher, general manager, stated that there was no doubt a good deal could be done in the direction of goods haulage by their tramways. Haulage in this way could be provided more cheaply than by the present means, but when the question was brought up certain people tried to raise objections instead of assisting in removing the difficulties. There would be no difficulty in a general sense in using the tramways for carrying goods. As it was, there was a large capital expenditure lying idle for a part of the day. The Lord Provost added that, as time went on, horse haulage would become more difficult and more expensive. Eventually it was agreed that the manager should submit a report on the matter.

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Crowding Out of Long Distance Passengers.—Christchurch Council have asked Bournemouth Tramways Committee if anything can be done to prevent the displacing of through passengers by people who use the cars for short journeys only. A reply has been sent that the committee have no power to prevent passengers travelling who require to go short distances only, and that as soon as more motormen are available a larger number of cars will be run. A Bournemouth newspaper adds that a "twopenny fares only" plan has been adopted with regard to cars running along Lower Parkstone route, and that the plan is not popular. The receipts on the Bournemouth cars are showing increases of nearly £650 per week on the corresponding week of last year owing to the great number of London visitors now in the town.

Queues in the Roadway.—The Sheffield coroner held an inquiry into the death of a woman, employed at a munition factory, who was fatally injured by a motor lorry while she was standing in a queue outside the works waiting for a tramcar. The evidence showed that the driver rang his bell and the people moved out of the way, but afterwards rushed to the car. An inspector who was regulating the traffic was of opinion that the lorry was travelling too fast, but the steerer stated that his driver slowed down to two miles an hour. The driver of a motor omnibus, which was following the lorry, estimated the speed at a little more than a mile an hour. "Accidental death" was the verdict, and the coroner remarked that it was a common sight to see these queues in the roadway. The tramway police and factory authorities ought to consider whether this traffic could not be better regulated.

Tube Railways as Air Raid Shelters.—In the light of the experience gained during recent air raids, the Commissioner of Police, who has been in consultation with the management of the Underground Railways, has issued the following public notice:—During the time of admission to these stations the public are urged to abstain from forcible rushes, to control which the gates may at any time have to be closed temporarily. When the number of persons already sheltered in any station is as large as can with safety be accommodated, the constables, regular and special, at the gates will close them. A notice to this effect will be exhibited. On the exhibition of the closing notice the persons outside awaiting admission would be well advised to proceed to some other shelter where there is accommodation for them, and so avoid the dangers of the open street at a time when splinters may be flying about.

PERSONAL.

Mr. H. Dickinson, city electrical engineer of Liverpool, has been granted an increase in salary from £1,500 to £1,600.

Mr. M. Bell has been appointed superintendent at the West Bromwich generating station at a salary of £300 per annum.

Mr. H. S. Ellis, electrical engineer of South Shields, has been granted permission to accept the appointment of Coal Controller's representative for the district.

Mr. T. Ridyard, rolling stock and works superintendent of the Liverpool Corporation tramways, has been granted an increase in salary from £400 to £500, increasing in twelve months to £550.

Sir Maurice Fitzmaurice, C.M.G., has been appointed by the Lord President to fill the vacancy on the Advisory Council of the Committee of the Privy Council for Scientific and Industrial Research caused by the retirement, by rotation, of Mr. W. Duddell.

Lance-Corp. Alex Brown., R.E., formerly an electrician with Dick, Kerr and Company, Ltd., at Preston, has won the Military Medal. The distinction was awarded for laying a cable across "No Man's Land" under heavy fire.

Mr. F. H. Corson, electrical engineer and manager of Gloucester city tramways, has been appointed local representative of the Coal Controller in the West of England. The Electricity Committee congratulated Mr. Corson on the appointment.

Mr. T. Coole, chief engineer's assistant in the Liverpool Corporation Tramways and Electric Power and Lighting Department, has been recommended by the committee to receive £500 per annum, with a further £50 a year hence, a total increase of £150 on his present salary.

Mr. E. P. Austin, who has been chief engineer at the Chesterfield Corporation Electricity Works since 1906, has been appointed chief electrical engineer at the Sheep Bridge works. In accepting Mr. Austin's resignation the Chesterfield Electricity Committee recorded their appreciation of his energy and ability.

Bailie Buist, convener of Dundee Tramways Committee, while attending the Municipal Tramways Conference at Blackpool, fell down a lift which was imperfectly guarded and was somewhat severely injured. He has made an excellent recovery and was able to take part in the deputation to the Minister of Munitions on Friday.

Birmingham Motorman Gains a Commission.—Sergt. H. W. Hughes, Royal Warwickshire Regt., formerly a motorman on the Birmingham Corporation Tramways, at the beginning of the war enlisted in a Territorial Force battalion of the county regiment. In 1915 he took part in the fighting in France. At the battle of the Somme he was wounded. On recovery in England, he returned to his battalion last November, and in February of the present year he was recommended for a commission, which was bestowed after he had passed a course of instruction.

We regret to record the death of **Mr. Frank Woodhead,** rolling stock superintendent of the Walsall Corporation tramways and motor department, which took place on October 9. Mr. Woodhead had held the appointment since September, 1903, and was formerly on the engineering staff of the Bradford Corporation tramways.

CONTRACTS AND ORDERS.

Gabriel and Company are to supply brake ratchets and bell springs to Portsmouth Corporation tramways.

Dublin Corporation Electricity Committee have accepted a tender for a Green's economiser.

The British Insulated and Helsby Cables, Ltd., have an order for the supply of trolley wire from Glasgow Tramways Committee.

The British Hele Shaw Patent Clutch Company's offer of 102 steel pinions at £212 has been accepted by Bradford Corporation.

Glasgow Corporation Cleansing Committee propose to purchase two additional Edison electric vehicles for refuse collection at £1,000 each.

Wolverhampton Corporation have accepted the tender of the British Thomson-Houston Company for a 5,000 kw. turbo-alternator at £17,803.

The Sterling Boiler Company's tender for boiler equipment with stoker, fans, chimney, etc., at £19,822 has been accepted by Wolverhampton Corporation.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Light and Power Company.—The Board announce a dividend of 2 ½ per cent. on the common stock.

Shanghai Electric Construction Company.—An interim dividend of 5 per cent. (10s. per share) is to be paid.

Rio de Janeiro Tramway, Light and Power Company.—A dividend of 1¼ per cent. on the capital stock is announced.

Silverton Tramway.—This company's report for the year ended June 30 shows an increase of £31,029 in the revenue. The balance brought forward to credit of profit and loss from June 30, 1916, together with a transfer of £5,374 from No. 2 reserve fund and the balance brought down from working account, has been absorbed in payment of dividends and allowance for depreciation.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended October 10 amounted to £52,549, an increase of £3,113 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to October 10 (twenty-seven and a half weeks) the total receipts were £1,542,362, an increase of £190,919 on the corresponding period of 1916.

Leith Tramways and Electricity Accounts.—Introducing the burgh rate for the current year, Provost Malcolm Smith stated that the tramways began the year with a debit balance of £3,252, and it was calculated that to meet the increased expenditure an addition of £9,700 to the revenue would be required. Since May 15 the receipts had shown an average weekly increase of £195, which, if maintained, would bring upwards of £10,000. On the electricity undertaking a debit balance of £4,579 was anticipated, as against £5,349 for the past year. The department would have to ask for another increase in the charge for energy.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-nine of the principal tramway undertakings in the United Kingdom for the week ended September 29 give total receipts of £205,849, or £19,779 more than in the corresponding week of last year. The total length of track included in the returns was 2,058 miles.

The receipts this year were at the rate of £100 0s. 5d. per mile of single track, and last year at the rate of £90 8s. 3d., thus showing an increase for the week of £9 12s. 2d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

The Life of Overhead Cable.—In renewing the ears on the overhead equipment in two streets at Oldham, Mr. P. Priestly, the general manager, found that the wiring was in good condition, with the exception of wearing slightly at the ears, but that by putting longer ears on, the life of the wire would be considerably prolonged.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.,
ENGINEERS & CONTRACTORS.

Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH, OCT. 11, or previous	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	72⅞	73
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	61/3	65/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69½	69½
4½%	4½%	Do. 4½% Deb.	100	98½	73	73¼
5%	5%	Do. 5% Deb.	100	96	68	67
—	—	Associated Omnibus Co., Ord. ..	5/-		1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	104½	103
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	4/-	3/6
6d.	6d.	Do. 5% Cum. Pref. ..	1		10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort. Deb. ..	100	72⅔	71¾	71¾
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	19⅛	19⅛
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	76	76
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	45½	45¼
$1¼	$1¼	Do. 6% Cum. Pref. ..	$100	97	90½	91¼
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6¾	6¾
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	25	25
5%	5%	Do. Pref. Ord.	100	106	30	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	39	38
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	50	53¼
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28	29
6%	6%	Do. 6% Cum. Part. Pref.	100	—	72½	72½
5%	5%	Do. 5% Deb.	100	92	76	77½
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71¾	71¾
1/-*	1/-*	Cape Elec. Trams.	1	1	11/-	11/-
1/3	1/3	City of B. A. Trams	5	5½	85/-	85/-
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	81	82
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7⅛	7¼
6/-	6/-	Do. 6% Pref.	10	12	10⅛	10⅛
—	—	Hastings & Dis. Elec. Tram Ord.	10/-		1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1		10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50¼
1/1½	5½d.	Hong Kong Tramway	5/-		17/1½	17/1½
5%	5%	Do. 5% Deb. ..	100	87½	70½	70½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1		2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9⅛	9⅛
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9½d.*	9½d.*	Llandudno & Colwyn B. Ord.	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1		1/9	1/3
6d.	6d.	Do. 5% Pref.	1		5/9	5/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61¼	61¼
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81¼
5%	5%	Do. 5% Inc. Deb.	100	89½	78½	78½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	32½	32½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5½	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9½d.*	Manaos Trams & Ltg. Ord. ..	1		3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1¼	$1¼	Manila Elec. R. R. & Light ..	$100	102	66	64
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33	33
—	—	Do. 1 Mt. 5% G.B. ..	—	84	45	42½
—	—	Do. 6% Mt. Bds. ..	100	76	40½	40½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	92½	93
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1		19/-	19/3
9½d.*	9½d.*	New General Traction	1	¼	7/3	7/3
8½d.	6d.	Northern Gen. Trans. Ord. ..	1		13/3⅜	13/3⅜
6/-*	3/-	Para Elec. Rlys. Ord.	5	4¼	75/-	75/-
5%	5%	Do. 5% 1st Deb.	100	89½	76	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/6	7/3
—	—	Do. 7% Non. Cm. Part Pf.	1	—	13/-	13/3
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1		6/4½	6/3
6d.	6d.	Do. 5% Pref.	1		10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	¼	19/9	19/3
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	87½	87½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	78¾	78¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	90½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/-	12/-	Shanghai Elec. Cons.	10	15	14⅝	14⅝
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¼	94¼
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	69	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	¼	18/3	18/6
3/-	3/-	Do. 6% Cum. Pref. ..	5	¼	83/9	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21¼	17	16¾
—	—	Undgd. Elec. Rys. of London ..	10	21½	37/6	38/1½
		Do. "A"	1/-	¼	6/3	6/3
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102¼	101¼
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	101½	101¾
4%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	84	82¾

*Indicates dividend for the year. In other cases the dividend is for the half-year

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Oct. 2	442	437	— 5	26	11,647	+ 1,020
Aberdeen Corporation ..	,, 5	1,912	2,084	+ 172	18	40,274	+ 4,604
Ayr Corporation ..	,, 6	331	504	+ 173	21	12,134	+ 1,091
Belfast City	,, 3	6,147	6,999	+ 852	27	170,348	+ 16,626
Birkenhead Corporation	,, 7	1,596	1,724	+ 128	27½	50,196	+ 7,619
Birmingham Corporation	,, 6	17,079	19,634	+ 2,555	27	490,131	+ 38,732
do. Motor Omnibuses ..	,, 6	960	1,248	+ 288	27	27,467	+ 169
Blackburn Corporation ..	,, 3	1,221	1,549	+ 328	27½	42,385	+ 6,236
Blackpool & Fleetwood ..	Sept. 22	1,268	1,535	+ 267	37	36,324	— 128
Bournemouth Corporation	Oct. 10	2,223	2,483	+ 260	27½	74,131	+ 5,037
Bradford Corporation ..	,, 6	6,492	7,902	+ 1,410	27	210,566	+ 19,501
Bristol	,, 5	5,217	6,269	+ 1,052	40	217,633	+ 20,455
Burnley Corporation ..	,, 6	1,797	2,099	+ 302	..	..	..
Burton-on-Trent Cor. ..	,, 7	321	341	+ 20	27	8,387	+ 754
Bury Corporation ..	,, 7	1,408	1,656	+ 248	27½	46,495	+ 5,539
Chatham & District ..	,, 4	1,353	1,050	— 303	40	51,921	+ 2,383
Cork Electric	,, 4	540	632	+ 92	40	21,994	+ 1,470
Derby Corporation ..	,, 6	1,190	1,279	+ 89	27	32,947	+ 1,247
Dublin United	,, 5	7,058	7,512	+ 454	40	268,326	+ 26,049
Dundee City	,, 3	1,439	1,641	+ 202	20½	31,833	+ 2,945
East Ham Corporation ..	Sept. 29	1,398	1,324	+ 74	26	37,569	+ 2,562
Exeter Corporation ..	Oct. 5	431	433	+ 2	27	11,293	— 31
Glasgow Corporation ..	,, 6	24,296	27,295	+ 2,999	30	485,458	+ 57,088
Glossop (U.E. Sup. Co.) ..	,, 6	146	177	+ 31	40	6,090	+ 526
Halifax Corporation ..	,, 2	2,223	2,587	+ 364	26½	68,549	+ 5,388
do. Motor Buses ..	Oct. 2	52	54	+ 2	26	1,294	— 64
Hastings and District ..	,, 7	1,076	1,304	+ 228	40	51,007	+ 7,616
Huddersfield Corporation	,, 6	2,791	3,376	+ 585	27	90,779	+ 8,411
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	Oct. 6	669	678	+ 9	27	21,257	+ 2,178
Ipswich Corporation ..	,, 6	477	700	+ 223	27	19,419	+ 4,253
Isle of Thanet	,, 6	338	181	— 157	1	181	— 157
Kilmarnock Corporation	,, 6	180	200	+ 20	20½	4,071	+ 346
Lanarkshire	,, 4	2,485	2,974	+ 489	40	110,092	+ 17,329
Lancashire United ..	,, 3	2,361	2,688	+ 327	40	93,601	+ 20,343
Leeds City	,, 6	9,902	11,428	+ 1,526	27	301,517	+ 30,696
Leicester Corporation ..	,, 6	3,536	4,068	+ 532	..	..	..
Leith Corporation ..	,, 6	886	1,089	+ 203	20½	22,694	+ 4,023
Leyton U.D. Council ..	,, 4	1,652	1,696	+ 44	27	52,144	+ 5,272
Liverpool Corporation ..	Sept. 29	15,079	16,290	+ 1,211	38½	601,540	+ 53,155
Llandudno & Colwyn Bay ..	,, 28	460	450	— 10	23½	15,603	— 971
London County Council	Oct. 10	49,436	52,549	+ 3,113	27½	1,542,362	+ 190,919
Maidstone Corporation ..	,, 4	280	300	+ 20	27	6,866	+ 659
Manchester Corporation ..	,, 6	19,169	21,882	+ 2,713	27	559,209	+ 42,390
Nelson Corporation ..	Sept. 29	237	253	+ 16	26	6,244	+ 443
Newcastle-on-Tyne Cor.	Oct. 6	7,123	8,156	+ 1,033	27	211,602	+ 30,754
New St. Helens & Dist. ..	,, 3	1,170	1,427	+ 257	14	22,513	+ 6,183
Northampton Cor.	,, 5	732	898	+ 166	27	22,719	+ 3,200
Nottingham Corporation	,, 4	4,064	4,711	+ 647	27	118,650	+ 11,201
Oldham Corporation ..	,, 7	2,313	2,839	+ 526	28	80,674	+ 9,030
Portsmouth Corporation	,, 6	2,745	3,041	+ 296	..	..	..
Provincial	,, 6	2,281	2,680	+ 399	8	2,292	+ 469
Reading Corporation ..	,, 4	930	1,222	+ 292	26½	28,421	+ 4,886
Rhondda Tramways ..	,, 4	1,419	1,659	+ 240	40	59,601	+ 8,366
Rotherham Corporation	,, 10	1,652	1,801	+ 149	27½	49,608	+ 6,558
Salford Corporation ..	,, 8	5,488	6,421	+ 933	27½	182,058	+ 28,881
Sheffield Corporation ..	,, 7	10,472	12,211	+ 1,739	28	335,223	+ 38,512
Southampton Cor.	,, 3	1,820	2,323	+ 503	26½	54,541	+ 8,736
Southend-on-Sea Cor. ..	Sept. 19	1,054	916	— 137	25	26,825	+ 94
South Shields Cor. ..	Oct. 6	861	965	+ 104	27	26,115	+ 2,938
Sunderland Corporation ..	,, 7	1,655	1,820	+ 165	27	49,759	+ 4,205
Sunderland District ..	,, 3	656	811	+ 155	49	35,111	+ 5,001
Swindon Corporation ..	,, 3	222	296	+ 74	26½	7,398	+ 1,797
Torquay Tramways ..	,, 4	648	823	+ 175	40	26,633	+ 2,035
Tyneside Trys. & Trmrds.	Sept. 19	654	955	+ 301	12	11,536	+ 2,887
Wallasey Corporation	Oct. 6	1,299	1,594	+ 295	27½	44,941	+ 5,195
Walsall Corporation ..	,, 6	841	1,036	+ 195	27	26,434	+ 3,296
Walthamstow U.D. Coun.	,, 6	1,076	1,088	+ 12	27	34,887	+ 3,842
Warrington Corporation	,, 4	463	592	+ 129	27	14,491	+ 1,148
West Ham Corporation ..	,, 4	3,395	3,252	— 144	26½	99,967	+ 10,935
Wigan Corporation ..	,, 4	1,775	2,072	+ 297	28	53,112	+ 7,256
Yorkshire (West Riding)	,, 7	1,835	2,106	+ 271	40	84,671	+ 14,120

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Decrease.
Anglo-Argentine	Oct. 7	£54,067	£55,070	40	£2,057,730	+ £25,830
Auckland .. (28 days)	Sept. 21	20,884	22,154	12	64,876	+ 2,018
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Aug.	7,405,000	8,064,000	34	60,505,000	+ 4,492,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Aug.	423,728	454,425	8	892,803	+ 57,218
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Aug.	24,413	26,714	4	26,714	+ 2,301
Calcutta .. .. Rs.	Oct. 6	77,886	68,907	40	2,731,142	+ 13,390
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Sept.	1,779	4,306	39	38,405	+ 15,805
Cordoba	July	14,258	14,343	18	56,154	— 1,165
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Sept.	2,523	1,512	9	3,074	— 1,971
Hong Kong .. .. $	Aug. 18	18,023	12,774	33	412,008	— 34,682
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Sept.	3,903	3,450	39	36,545	— 1,076
Lima	May	33,966	35,321	21	181,809	+ 15,098
Lisbon .. .. Escu	July	..	237,832	..	..	..
Madras .. .. Rs.	Sept. 30	31,788	34,219	38	624,412	+ 54,626
Manila .. .. $	July	144,913	165,693	..	..	..
Manaos .. .. Rs.	June	152,380	162,157	..	..	..
Montevideo	Sept.	26,711	29,426	48	329,679	+ 10,656
Pernambuco	Sept. 30	3,094	4,061	38	146,072	+ 28,504
Peruvian .. .. $	Sept.	911,910	950,740	13	2,905,170	+ 261,930
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Sept.	4,137	5,163	39	14,354	+ 3,026
Shanghai .. .. $	Aug. 22	21,712	22,360	..	..	..
Singapore .. .. $	Aug. 11	13,711	12,907	32	415,039	+ 15,731
Toronto .. .. $	Aug.	889,241	1,039,819	34	7,867,595	+ 775,866
Winnipeg .. .. $	Aug.	249,795	248,457	34	2,104,824	— 29,335

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, OCTOBER 18, 1917. VOL. XLII.

PROGRESS IN THE USE OF TRAIL CARS.

BARROW ADOPTS TYPE OF CAR USED IN LONDON.

How great a disservice the Board of Trade did when for many years it discouraged the use of trail cars, has been felt since the war began as it never was before. If official opposition had been removed, as it should have been, many years ago, when the war broke out there would have been available for handling munition and other traffic a large supply of light cars; for tramway undertakings all over the country would have possessed themselves of trail cars for coping with emergency traffic. Such cars were comparatively cheap and the undertakings could have afforded to have a good supply of reserves. In the early days of electric traction trail cars were used to a small extent with very good results. In 1898, when the Kidderminster and Stourport tramway was electrified, that company, for instance, found trail cars an advantage, and there were a few similar examples. Subsequently, for what reason it is impossible to discover, the Board of Trade began to look unfavourably upon the idea, and at length refused to allow trail cars to be used. It is quite possible that certain consulting engineers, with little experience in tramway operation, were partly responsible for indoctrinating the officials with anti-trailer opinions. We once heard that a consultant, who certainly never was called upon to work out a schedule for a special service to meet the demands of the public on the occasion of a great football match, airily remarked "that it was much better to have each car a self-controlled unit; there was much less difficulty in adjusting the cars to the service." In these early days rigid economy was not regarded as necessary; electric traction was somehow to be so cheap that there would be ample margin, and all the motor cars wanted could, of course, be provided. To what conditions such anticipations led in London all the world now knows.

The police authorities in the metropolis naturally accepted the views of the Board of Trade with respect to trail cars, and for many years sternly opposed their use. As the pressure of enormous standing charges entailed by heavy expenditure on the conduit system began to be felt, the London County Council looked about for methods of economy, and gradually they were led to adopt the view often advocated in these columns that trail cars would be a great advantage to them. They met, however, with opposition from all the authorities concerned. Alarming consequences were prognosticated by the police authorities, to whom the idea of two-coupled cars following one another on a rigid track in a London street was novel, and therefore to be resisted, just as every other tramway innovation has always been resisted by them. The Council, however, were undeterred, and in 1911 they decided upon a progressive movement and proposed to seek Parliamentary powers to run coupled or trailer cars.

The proposal was of importance because success would not only break down the barriers against trail cars in London, but it would alter the attitude of the Board of Trade and enable such cars to be used throughout the country. Letters were published in our columns during 1912 from leading managers in the United States and on the Continent, which revealed

Trail Cars at Barrow used for Munition Traffic.

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an overwhelming opinion in favour of using trail cars, and proved that they did not add to the danger of tramway operation. To quote only one example, Mons. A. Mariage, the well-known managing director of the Paris General Omnibus Company, remarked in the course of a cogent letter, "Our long experience of trail cars upon a line of heavy traffic and in crowded streets seems to us conclusive."

In due course the matter was fought out in Parliamentary committee rooms. During the contest the members listened to much adverse evidence by the police, but eventually the London County Council emerged with a partial victory. Trail cars could be used, but they were to be restricted to certain hours of the day. Naturally soon after the outbreak of war all barriers were removed, and the undertaking, as well as the public, have been greatly advantaged. It is unnecessary to add that none of the alarming consequences imagined by the police department have been realised.

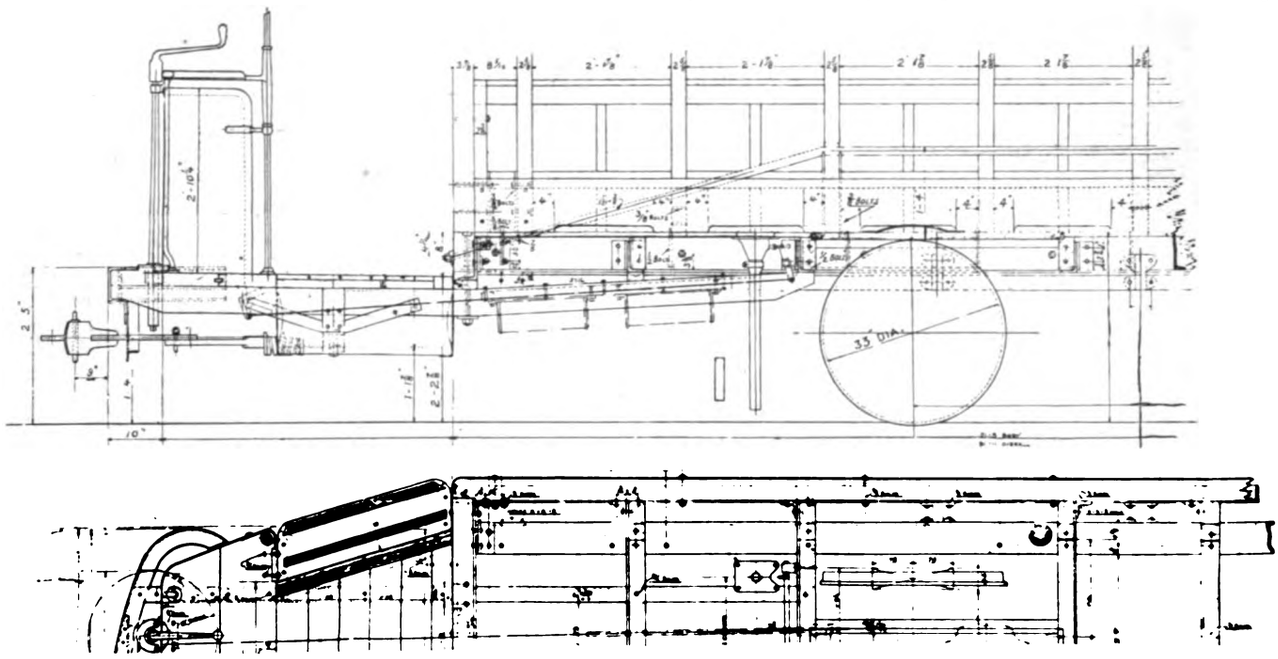
Doubtless the example of the Council would have been followed in many other places if there had been no restrictions on the acquisition of additional rolling stock. As it is, a few other undertakings have made use of trail cars. Among them is the Barrow-in-Furness Tramway Company, whose cars are illustrated herewith. These cars are identical with the trailers now in use by the London County Council. Both inside and outside seats are ranged laterally, with an aisle between, so that all passengers may face in the direction in which the car is moving. The motor cars, which are of the single-deck type, are equipped with two Brush Company's 1,002 motors, each of 35 H.P. The trailers were built to the order of the company with the special object of meeting the exceptionally heavy munitions traffic, and they have proved an an immense boon at all times when traffic is at the peak.

There is little doubt that as soon as it becomes possible to obtain rolling stock, trail cars will come into common use throughout the country. To those who yet have any doubts as to the desirability of their advantage and safety, we recommend a perusal of the letters which appeared in our columns during 1912. Some of these were from the managers of tramways in Germany, but in electric traction, as in some other matters, we need not scorn to learn from the enemy.

SHANGHAI TRAMWAYS SPECIAL WORK.

Supplementing the description of the Shanghai tramways which was published in our issue of September 13, 1917, we now give some additional details with regard to the track construction. The rails are of the British standard section 1, weighing 90 lb. per yard. The track has numerous passing places, and these and the junctions were all constructed on the ground. There are also many special junctions, all of which were constructed and supplied by Edgar Allen and Company, Limited, Imperial Steel Works, Sheffield, for both the English and the French concessions. The main line points and crossings for the English concession were supplied by the same firm, while Hadfields, Limited, of Sheffield, supplied those for the French concession.

On the English side there are 15 examples of special work varying in size, some of which are illustrated in the accompanying views. The largest piece of work, shown in Fig. 2, consisted of eight pairs of points and 28 crossings. Three of the centre crossings are in triple and five ways. Fig. 1 shows one of two triangles being put together on the ground. In Fig. 4 is illustrated a specimen of the double junctions. The layout for the car fan, comprising two pieces of six tracks, was constructed by Edgar Allen and Company, Limited, as will be seen in Fig. 5. A standard type of points and crossings was adopted for both English and French lines; those for the English concession being 12 ft. long and those for the French concession 10 ft. 6 in. long.



Part Plan and Elevation of Trail Car, showing arrangement of Draw-Bar -Barrow-in-Furness Tramways.

Australian Tramways and Railways.—An official report on means of transport and communications in Australia, which has recently been issued, shows that at the end of June last year the length of electric tramway lines in the Commonwealth was 406 miles and that no fewer than three gauges were employed, namely:—3 ft. 6 in., 75 miles; 4 ft. 8½ in., 320 miles; 5 ft. 3 in., 5 miles. There were also 102 miles of steam tramways, 46 miles of cable tramways, and 60 miles of horse tramways. There were 20,738 miles of Government railways and 1,149 miles of private railways open for traffic. The gauge variations (which are even more remarkable than in the case of tramways) and the length in miles of each gauge are as follow:—2 ft., 308 miles; 2 ft. 6 in., 122 miles; 3 ft. 6 in., 12,315 miles; 4 ft. 8½ in., 5,120 miles; 5 ft. 3 in., 5,041 miles. This total of 22,906 miles includes, as well as the two items given above, 1,019 miles of private railways used for special purposes.

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Fig. 1.—One of Two Triangles under Construction.

Fig. 3.—Laying Track with Passing Place in Narrow Street.

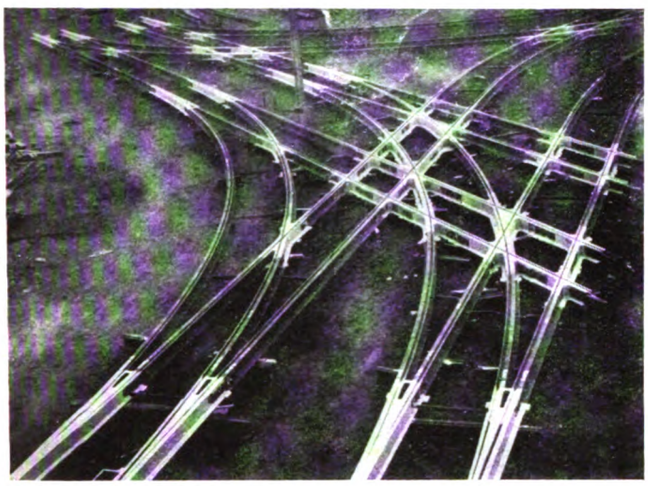

Fig. 2.—The Largest Piece of Special Work in Shanghai.

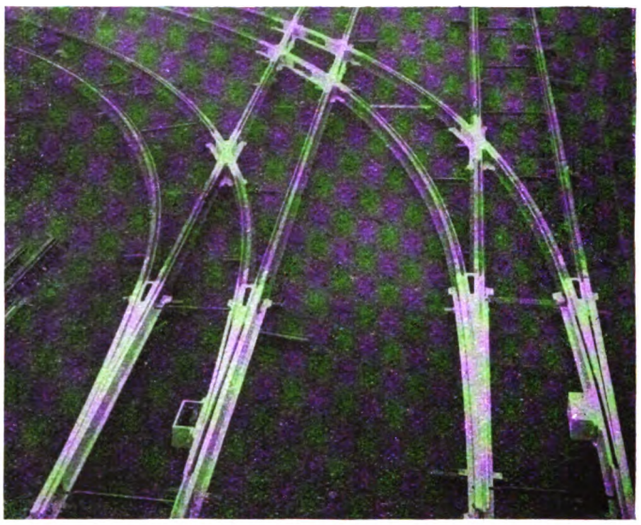

Fig. 4.—One of Numerous Double Junctions.

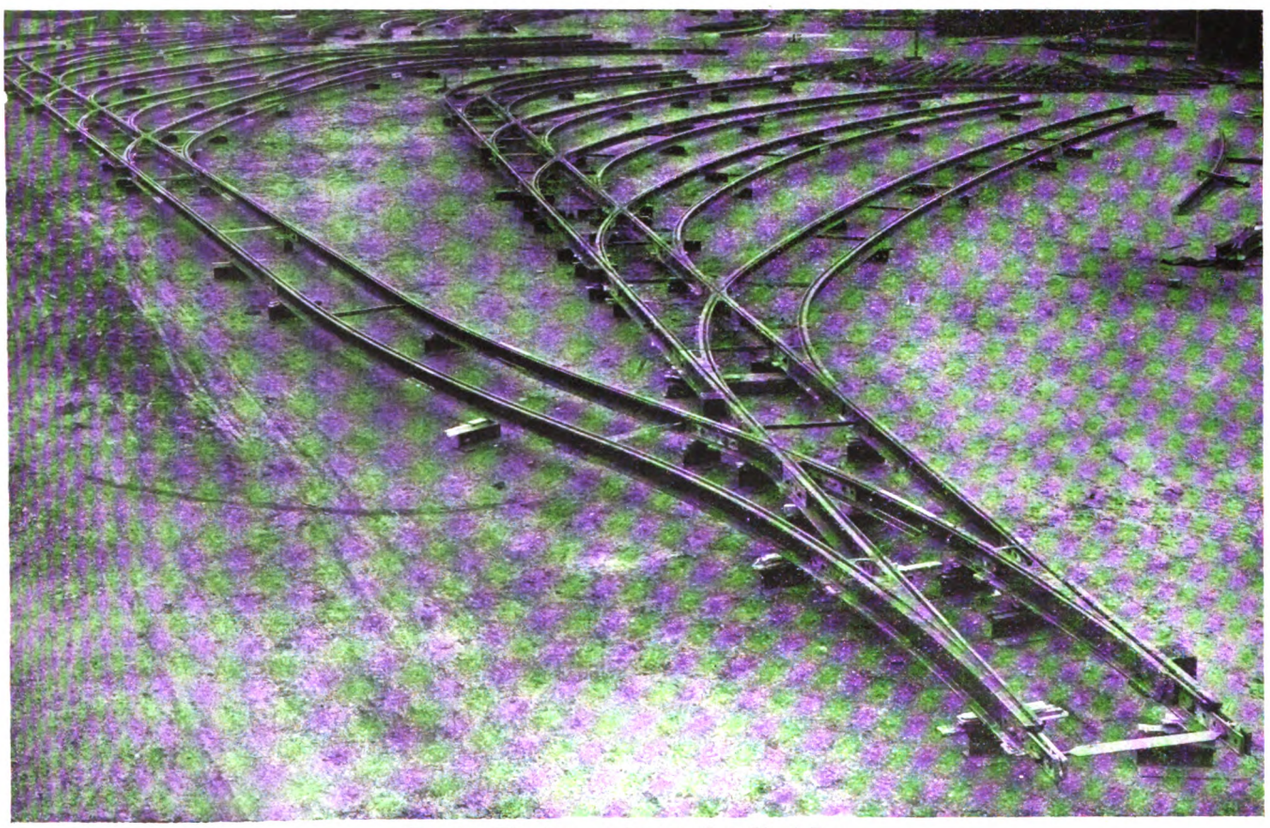

Fig. 5.—The Layout for the Car Shed Fan.

SPECIAL TRACK WORK—SHANGHAI TRAMWAYS.

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SOUTHAMPTON'S ELECTRIC TIP WAGON.

About a year ago, on the advice of Mr. W. T. Robson, general manager and engineer of Southampton Corporation Tramways, a 2-ton Edison tip wagon was purchased, and Mr. Robson has now presented a detailed report of the work of this vehicle for the first 12 months, which shows that the machine has proved a success in every way. An accurate record has been kept, by means of weekly cost sheets, and these give the following totals :—

	£	s.	d.
Stores (including canopy and wind screen)...	9	10	0
Wages	95	0	0
Electricity	53	4	1
Cleaning and maintenance	8	10	0
Tires	25	0	0
Insurance	7	4	0
Spare parts (including new chains) ...	7	11	9
Depreciation (10 years' life)	95	0	0
	£300	19	10
Deductions :—			
Income from other departments ...	153	17	11
Saving effected on contracts	34	8	4
Net cost of year's working ...	£112	13	7

The total weight of material carted amounted to 2,500 tons, including 1,300 tons of general tramway carting and 1,200 tons carting for other departments. As no records were kept of the work previously done by horses, the exact weight cannot be given, but it must have been considerably less, as it was always found necessary to engage additional horsing whenever scrap was carted away or reconstruction work was in progress. This additional expense should, of course, be added to the ordinary horsing cost, which for the 12 months before the tip wagon was purchased amounted to £412 10s. 6d. Deducting the income from hire to works department and from the sale of manure, £135 11s. 7d., the net cost of the year's working stands at £276 18s. 11d.

These figures, although showing a saving of over £164, do not, Mr. Robson adds, by any means denote the entire usefulness of this vehicle, which has taken the place of one of the tower wagon horses in towing a second tower wagon nearly every Sunday, in saving the cost of a large gang of men when moving rails, and by means of its extraordinary capacity for work has rendered unnecessary the need for additional horsing from outside. It has averaged nearly eight hours' work per day, has never been out of commission, and has given no trouble whatever.

The battery, which is the most expensive feature, has required no attention except to keep externally clean and for occasional filling up with distilled water, both operations taking only one hour per week. During the forthcoming year the liquid will probably require renewal at a cost of approximately £8, but otherwise Mr. Robson does not anticipate any further expense than is shown in the first year's costs.

Edison 2-ton Tip Wagon—Southampton Corporation Tramways.

EDINBURGH TRAMWAY DEVELOPMENT.

Although the Corporation of Edinburgh decided last year that the conditions created by the war gave them no alternative but to postpone taking action on the consultants' report upon developing the city's tramways, circumstances appear likely to force earlier action in one direction. In consequence of the Admiralty having purchased an extensive area on the south side of the Firth of Forth, the Tramways Committee consider that it is necessary to ask for powers in the next session of Parliament to construct a line to South Queensferry, a matter that has been before them for three years. A motion for the Council to give notice to that effect has been accepted, and Councillor Harrison, chairman of the committee, informed the Corporation that they believed the extension would prove profitable, and that there were no engineering difficulties to be encountered. The burgh engineer has prepared a report on the two available routes, and Councillor Deas has a scheme for taking further advantage of the extension, which, he says, is going to vitalise the whole of the south of the Forth. He has given notice of a motion to consider an extension to Port Edgar, with a section between this line and the Leith Ferry Road tramway, and also between Seafield Links and Portobello. By adding these comparatively short lengths there will be a tramway extending from Port Edgar to Port Seton.

In his report on the questions of the route, the burgh engineer refers to route No. 1 by way of Dean Bridge, and route No. 2 by way of Comely Bank. In either case it is insisted that an essential to success

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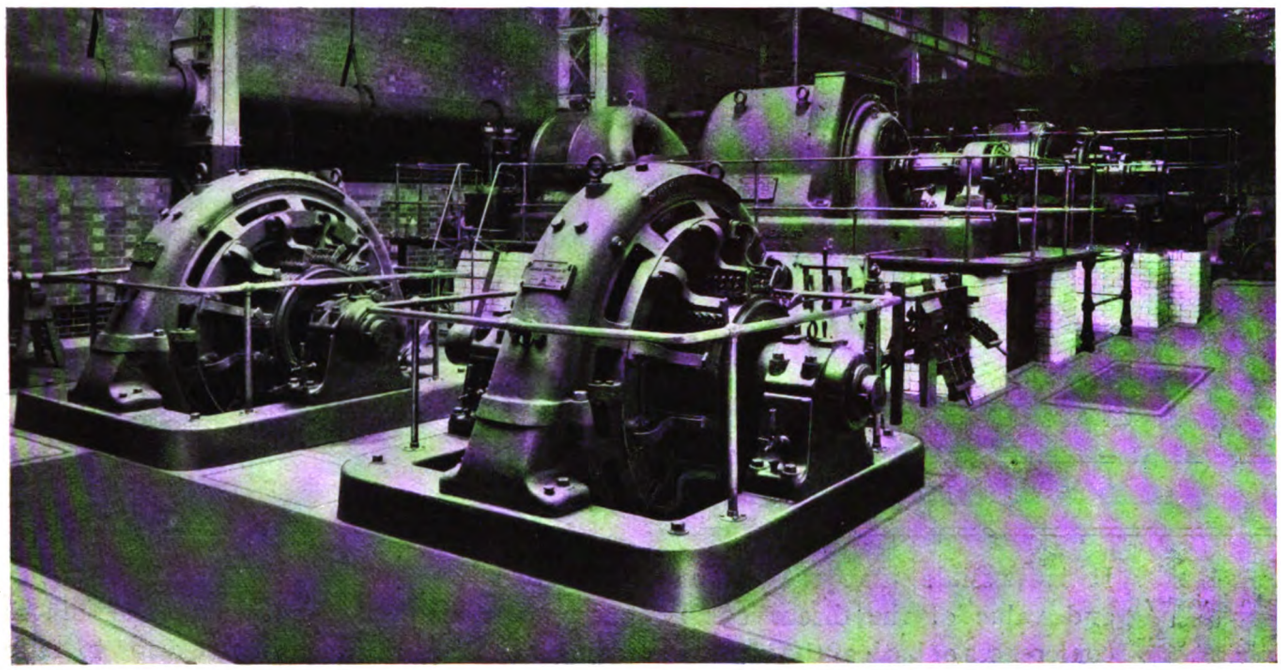
should be a through service from a convenient centre or terminus in the city to the terminus suggested at South Queensferry—the Hawes Pier. Route No. 1 starts from Hope Street, a terminus already authorised for tramways, thence along Queensferry Street, Dean Bridge, Queensferry Road, Blackhall, Davidson's Mains, Barnton, Cramond, Dalmeny, and onwards to Queensferry. Route No. 2 starts at the south end of Hanover Street, directly opposite the Mound, thence along Hanover Street, Queen Street (north side), and along the cable route to Stockbridge and Comely Bank, and thereafter continuing along the road towards Craigleith Station, whence its course to Queensferry would be identical with route No. 1.

Having regard to the advantages which both of these routes possess, it may be thought desirable that in any powers necessary to be obtained both should be included in the application. From Craigleith to Queensferry, these two routes, being on identical lines, are thence treated as one. As such the route may be either (1) partly on the road and partly on and through the fields, *ex adverso* of the road, or along the road for its entire length. The combination of road and field, it is pointed out, present much advantage. In this way those stretches of road such as along Cramond Bridge and parts westward therefrom in Linlithgowshire, against which objection might be taken by the County Council, are mainly avoided. Thereby a large capital sum is saved, and considerably increased speed is obtained. Convenient and frequent connections with the highway could be made. In the aggregate the measurements of road tramway and field tramway are: On route No. 1, *via* Dean Bridge, on road 3 miles, in fields 5 miles—total, 8 miles; route No. 2, *via* Comely Bank, on road $3\frac{5}{8}$ miles, in fields 5 miles—total, $8\frac{5}{8}$ miles. The system of traction recommended is overhead electric. The service suggested is every ten minutes for, say, 16 hours daily. Conditions which are indicated as making for the success of the undertaking are:—(1) The Rosyth Naval Base, now an accomplished fact; (2) the favourable attitude of the Admiralty to the Corporation; (3) the increase of motor traffic; (4) the near expiry of the cable tramway lease; and (5) the contribution of such a tramway to the city's commerce.

GENERATION OF CONTINUOUS CURRENT BY TURBINES.

The practice of generating continuous current by the use of turbo-alternators coupled to rotary converters is rapidly extending, and one of the numerous installations of this description laid down by the General Electric Company, Limited, is shown in the accompanying illustration. This plant is installed in an important engineering works, and comprises a 1,500 KW. Witton turbo-alternator running at a speed of 3,000 revolutions per minute, and generating six-phase alternating current, which is delivered to two 750 KW. Witton rotary converters running at 600 revolutions per minute, and generating continuous current at 460 volts.



1,500-K.W. Witton Turbo-Alternator Coupled to two 750-K.W. Rotary Converters.

The installation has proved completely satisfactory, and has again demonstrated the utility of this method of generating continuous current, which enables the turbine to be run at a high speed of 3,000 revolutions per minute, by which the highest efficiency is attained, while at the same time the continuous current commutators on the converters can be designed with a peripheral speed consistent with satisfactory working.

In the background of the illustration a 750 KW. Witton continuous current turbo-generator set is seen which has now been running for over ten years. This type of machine is now superseded for the generation of continuous current by the combination described. The complete installation was laid down by the General Electric Company, Limited, of Witton, Birmingham, and Queen Victoria Street, E.C.4., whose leaflet (M. 4) gives full technical particulars of the arrangement and advantages of units of this description.

The Morecambe Tramways—the only horse traction undertaking owned by a municipality—are to be electrified as soon as Parliamentary powers can be obtained and the materials become available. The Council came to this decision at their September meeting, when it was agreed that the application should be for the adoption of electricity or some other form of mechanical traction. The undertaking was purchased from a company in 1908, but ten years before that date the Corporation had themselves constructed the Bare and East View section. Two Edison battery omnibuses are to be added to the existing small fleet of those vehicles as soon as possible.

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An Industry without Driving Power.

It is possible that the interest and value of the discussions at conferences of both of the tramway associations would be increased if the programmes were less ambitious. An effort is generally made to provide too many papers, and some of the papers cover far too much ground. As a consequence the discussions tend to become discursive. A little is said about a great many topics, and speakers wander over a field so wide that only a bird's-eye view can be taken of it. Papers of general range are, of course, desirable; but others might usefully deal with a specific problem that could be thoroughly discussed. In some cases a definite resolution might be proposed. The result would not be understood as committing the Association, but as expressing the opinion of those present after a discussion of the question. This practice was followed by the Continental Tramways Association, and it did, we think, enhance the interest and maintain the quality of the debates. In many cases it should be possible to obtain practical unanimity of opinion, and this would often facilitate improvements and reforms. Had the tramway conferences some years ago expressed, for instance, the view that trailer cars were desirable, it is scarcely probable that official resistance to the proposal would have persisted so long, and to-day municipal traffic difficulties would have been less than they are. In the tramway industry there are changes that urgently require to be made; they are generally admitted to be necessary and desirable, but there is no driving force sufficient to secure them. Now the tramway associations ought not to be content year after year to discuss these urgent claims; they should themselves act. Who will, if they do not? Supported by resolutions of the conferences, joint committees of both associations would be in a position to go to Government departments with the authority of those who know what is required in the public interest. When legislative action is needed the Board of Trade should be impelled to secure it. The President of the Board is himself a practical expert in the business of transport, and properly supported by the tramway industry his assistance could be counted upon to secure for it greater freedom to serve the public. There has never been a more favourable time; but what is the industry doing to take advantage of it except to talk? Why can we not have a real tramway congress, including all those who have the same interests, whether they be representatives of municipalities or companies, at which a progressive tramway programme could be drawn up and an agitation commenced that would secure greater scope for an industry on which, as the past three years have shown, the welfare of the public depends in no small measure.

Development Prospects.

Circumstances combine to favour plans for the development of inter-urban light railways, though of late years the legislative conditions attached thereto have mainly left the field to the omnibus. This, when privately owned, has only to secure the sanction of local authorities to be at once put in service. But last year's emergency legislation for the protection of the roads has placed that vehicle in difficulties as regards new routes, while many authorities are seeking to impose road charges before they renew existing licences. Wherever there is industrial activity due to the war inter-urban traffic has increased; around

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the numerous national munition factories towns have sprung up, covering in one instance an area of nine miles by three. In one county omnibus traffic has become so extensive that the chairman of the Highways Committee has suggested the construction of light railways alongside existing roads. Railway companies have been forced by the exigencies of the war to discourage short distance traffic. To atone for that shortcoming the manufacturers of motor vehicles, who can with difficulty maintain the output required by the Government, have been permitted to supply industrial and passenger conveyances. The difficulties of the railways should prove the tramway operators' opportunity. The paper on freight traffic presented at last year's Municipal Tramways Conference shows exactly how tramways stand in relation thereto. The outlook for freight conveyance will be improved for a considerable time after the war by the crippled condition of the railways. Further testimony as to the value of the transport of freight by the Leeds tramways was given at this year's conference by Alderman Spencer, as chairman of the company whose mineral traffic—of vital importance to the manufacture of munitions—is thus dealt with. The distance is five miles, and a portion of the track has been laid by the Corporation on private land. Fifty thousand tons of fireclay are dealt with per annum, to the financial advantage of both parties. The roads are relieved of the passage of one hundred horses and carts; it is impossible to obtain motor vehicles. Under the altered local and national circumstances opposition from railway companies may be regarded with less apprehension. Even before the war there were localities where they discouraged short distance passenger traffic, as in the Cardiff-Newport case, mentioned in Mr. Ellis's paper on "Tramways Development." Two other considerations should assist the inter-urban movement. Now that permanent recognition is likely to be given to the necessity of increasing the supply of home-grown food, a great rural revival may be anticipated. The allotments movement, and the carrying out of the great programme of urban and rural housing, are likely to add to the number of persons living further away from the towns. It is not surprising to find, in a forecast of the report of the Royal Commission on Housing in Scotland, that the Commissioners are likely to recommend the construction of wide highways to carry special tracks for high-speed tramways. This is the only adequate method for securing movement of the population to the outskirts. As a preliminary it would be well for tramway authorities to press the Reconstruction Committee for such amendments to tramway legislation as experience has shown to be necessary if enterprise is not to be handicapped and discouraged. There are other districts similar to that between Cardiff and Newport ripe for industrial and residential development, which require road transit to set the forces of progress in motion. The most difficult part of the problem will be encountered in considering what part light railways can play in securing intensive cultivation of the land, and in this matter the experience of Belgium should not be overlooked. When every aspect has been weighed rail traction will be found the most economical method both for urban and rural communication.

Work of The Municipal Association.

At the Blackpool conference Mr. W. Murray at the close of his paper on "Special Fares" suggested that "to retain confidence and support the Association must devote less time to the consideration of purely academic, theoretical, or even technical questions, and bestow its thought and energies on matters of more prosaic but more pressing and general everyday interest." As a peroration the sentence is excellent, but it is not altogether in harmony with the facts. The author's paper itself is a tribute to the practical character of the Association's deliberations, and what could be more apposite to the requirements of the time than the presidential address of Mr. Mozley, the "Notes on Tramway Finance" by Messrs. Barnard, Holford, and Priestly, or the subject of Mr. Arthur Ellis's discourse on "Development of Tramways"? The same practical note was struck in the papers and reports presented at the two previous conferences held since the outbreak of war. The earlier proceedings reveal little or no ground upon which to base criticism. Nor did the remarks of any of this year's speakers indicate

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that Mr. Murray's view is shared by the membership. After all it is really the membership that moulds the programmes, and not the Council; every paper represents the respective author's view of current practice or requirements. If it may be said that there is one department deserving of greater attention it is that relating to technical matters, accompanied by research such as was carried out a few years ago in regard to brakes and in relation to car meters. The President hinted that there are arrears of technical matters waiting consideration, and now that it has been decided to resume the annual meeting of the managers' section it will be possible to deal with these subjects. It is to the managers and engineers that the Association must look for greater activity in regard to technical questions. Many important matters that have claimed attention locally owing to the war afforded good reason for the abandonment of the managers' gathering, but it now seems possible for the managers and their leading assistants to devote more attention to equipment and engineering problems. Possibly the troubles that the local staffs have had to encounter as a result of the war might be utilised for a joint paper or a report for next year's conference.

Economy in the Use of Coal.

The chief points in the Coal Controller's appeal to central station engineers, at the Municipal Electrical Association's meeting, to effect further coal economies, were commented on in our issue of July 12. Attention was also called to the deliberations of the Board of Trade Electric Supply Committee as to permanent steps to be taken to facilitate and cheapen the supply of energy, with a view to aiding British industries after the war. While the proposals of the latter body have yet to be submitted, the interval has been used to good purpose by the Coal Controller. Mr. Calthrop is being locally aided in his difficult task by representative electrical engineers, and on September 26 he issued a memorandum embodying suggestions for effecting economy in coal consumption. Public services are affected by the proposals. The Controller proposes the curtailment of services entailing coal consumption, such as early and late car traffic, after consultation with the Ministries of Munitions and Labour, where munition and important work is likely to be affected. As far as the reduction of night services is concerned, this step will be a continuation of the practice widely adopted last winter consequent upon the strain entailed by the restricted lighting. Another step that the Controller advises will enable energy to be conserved for tramway and other essential services. He suggests application to the Board of Trade for sanction to disconnect non-essential consumers in case of urgent necessity; this authority to be obtained ready to be exercised when needed. Another idea is an arrangement with neighbouring towns to inter-connect distribution or generating plants by means of underground cables, or, in suitable cases, of temporary overhead wires over intervening country. This would enable one or two of the most economical stations in each district to supply several towns at light loads, and would also permit the various plants to shut down in turn during week-ends and holidays to effect repairs. It would provide, too, some amount of power as a stand-by in case of coal supplies giving out locally. While this course may not be easy of adoption where there are tramways, the difficulty experienced in obtaining fuel will doubtless secure its application to other towns. More than a year ago the necessity of preserving the power supply against the risks arising from aerial activity led a number of boroughs in the capital to adopt inter-connection. Their conversion to the scheme, which had been advocated long before the war, serves to accentuate their lack of foresight. The district conferences convened by the Board of Trade Committee were another factor in securing that result, and similar action has been agreed upon by many provincial authorities, including those with traction loads, as an after-war measure. The memorandum of the Coal Controller is intended to meet present necessities, and prompt consideration is being given to it. At Leeds the Corporation officials have met Mr. T. Roles, city electrical engineer of Bradford, and Yorkshire district representative of the Controller, and discussed schemes for a reduction in coal consumption on lines suggested in the memorandum.

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The Municipal Tramways Association

(INCORPORATED)

Sixteenth Annual Congress, held in Blackpool, September 20 and 21, 1917.

The success of the annual conferences has long been a tradition of the Municipal Tramways Association. That tradition originated in the success of the first conference in 1902, and up to the beginning of the war there had never been an annual meeting that in the opinion of some of those who attended was not "one of the best conferences the Association had ever held." Since the war the meetings have necessarily been of a somewhat different character. In 1914 the proceedings were limited to a formal business meeting, and in 1915 and 1916 the conferences were held in London, and were shorn of much of their general interest, although they were well attended, and provided papers and discussions that were of practical value, as they assisted committees and managers to form their opinions on certain points that were then of special importance. This year the council decided to revert to previous practice, and to hold the meeting in some other place than London. Mr. Mozley, the president of the year, naturally desired that the members should meet in Burnley, where he has been the successful tramway manager for many years, but in the absence of suitable accommodation there for such a large gathering he accepted the invitation of the Blackpool Tramways Committee, and the meeting was accordingly held in that popular resort. The meeting was confined to two days, and the time devoted to the work of the conference was the same as at the London meetings in the two preceding years. There were no excursions, and the Association arranged no extraneous attractions. The programme was, in fact, a severely simple one, wholly in keeping with the strenuous times in which we live. Nothing, indeed, was different from the London conferences except the place and the greater opportunity the members enjoyed of meeting one another after the work of the day was over.

In these circumstances there were some who thought the prospects for the conference somewhat doubtful, but the doubters were agreeably surprised. In attendance, in the interest of the discussions, and in its social aspects the conference in Blackpool was thoroughly successful. More than sixty municipal tramways were officially represented by delegates numbering from one to four each, and judging from the remarks made by many of them it may safely be concluded that none felt that their time had not been well spent. Those corporations who did not send delegates deprived themselves of an advantage, and their neglect to do so was a false economy of time and money. There is no virtue in that kind of Spartan denial, which is due to blindness to the best interests of the business that a tramway committee controls. The tramway industry is not parochial, and any undertaking which refuses to contribute its share to the general fund of experience will in the long run suffer for its narrowness of view. The annual conferences have often focussed and given driving force to changes that have proved of much benefit to the industry, and there is nothing else that could take their place.

From the opening of the conference to the conclusion the proceedings were marked by businesslike precision, but the programme was too long to enable full justice to be done to it. Many members who desired to speak on various points found no opportunity to do so, although the fullest use was made of the time available. Mr. Mozley proved an excellent president, and capably and unobtrusively managed the proceedings so that in spite of its length every subject on the programme was discussed. At the conclusion of the conference he was given a cordial vote of thanks for his services, and on all sides he received congratulations on a successful year of office. He is succeeded by Alderman S. Flint, chairman of Leicester Corporation Tramways Committee, who has long been a useful member of the Council. The new vice-president is Mr. T. B. Goodyer, general manager of Croydon Corporation Tramways, and a more popular appointment could not have been made.

When Mr. Mozley opened the conference on the Thursday morning, the Mayor of Blackpool (Mr. A. L. Parkinson) was present to welcome the members. Referring to the paper on fares which was about to be discussed, he alluded proudly to the fact that while some other tramway undertakings found it necessary to increase fares, Blackpool, in spite of increased expenses and war allowances, needed to make no changes. The financial success of the undertaking was conspicuous. The Mayor might have added that, unlike some other Corporations, they had not tried to achieve the impossible by granting unremunerative fares.

The conference then listened with interest to Mr. Mozley's presidential address. This bristled with debatable points, and were it not for the rule that the presidential address is never discussed, there would no doubt have been a lively interchange of views. Mr. Mozley's idea that sinking funds for municipal tramway undertakings are wrong will find many sympathisers in these days when the charge presses hardly on many undertakings; but his dictum that "tramways are ever growing in value" is based on the bold assumption that the future has no surprises in store. The question whether the periods usually fixed for repayment of loans are in need of readjustment might, however, well receive attention, particularly in view of the expansion of tramways that will come after the war. Useful, too, was the reference to standardisation of rolling stock. Much can be done in this way, but care must be taken not to check improvement. The president's views of the Tramways Act of 1870 will have the unanimous assent of all in any way familiar with tramway history in this country. Nothing more inimical to tramway development than the passing of that Act has ever taken place; and the suggestion that both the tramway associations should

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combine to urge its revision should lead to some practical step. The omens are not auspicious, but a strong effort ought to be made at once. The final suggestion of the address that the employees should in some way, as proposed in the Whitley report, be invited to share the responsibilities of committees and managers, will no doubt become a subject of consideration in the not far distant future.

On the motion of Alderman S. Flint, a vote of thanks was cordially given to the president for his address. In supporting the proposal, Mr. J. B. Hamilton alluded to the presence for the first time in the history of the Association of a number of ladies, who were present as representing women who in the existing emergency were now so largely employed on tramways.

The first paper, entitled "Some Notes on Tramway Finance," prepared by Mr. J. Barnard, Mr. F. Priestly and Mr. G. W. Holford, was presented by the latter. It was a practical discussion of a number of points, on many of which a long debate might well have taken place; and the authors had some reason for complaint that the discussion went outside even the wide range of topics they had touched upon. We had, however, an able address from Alderman C. F. Spencer, chairman of Halifax Tramways Committee, who opened the discussion, and very capably dealt with the financial problems affecting not only tramways but local authorities and the nation. Alderman Spencer's remarks will be found in full in our report, and we bespeak for them the study of everyone interested—and who is not—in the problems that confront government with respect to finance in the unprecedented conditions that now exist. Mr. Arthur Ellis, engineer and general manager of Cardiff tramways; Alderman R. T. Fletcher, Wigan; Bailie W. W. Montgomery, Glasgow; Councillor R. J. Bishop, Walthamstow; Mr. William Murray, manager Walthamstow tramways; and Councillor Fryer, Birmingham, took part in the discussion that followed.

Among the guests present was Mr. W. G. T. Goodman, chief engineer and general manager of Adelaide Municipal Tramways Trust, who is visiting this country on official business, and on the invitation of the president he made a very interesting and pertinent contribution to the debate. Confining his remarks to subjects dealt with in the paper, he gave much useful information with regard to such matters in Australia, and he was listened to with close attention.

The next subject was "The Rule of the Footpath." This was to have been introduced by Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, but owing to the King's visit to Glasgow he was unable to be present. In his absence Bailie W. W. Montgomery, convener of Glasgow Tramway Committee, read Mr. Dalrymple's notes advocating the adoption of the rule that pedestrians should keep to the left side of the footpath, instead of to the right, because of the increased safety that would thus be secured.

Mr. H. E. Blain, operating manager of the London General Omnibus Company, a former president of the Association, strongly supported the change, and said that three-fourths of the fatal accident claims with which his company had to deal would be avoided if pedestrians would keep to the left. He also made the notable statement that the safety first campaign was saving his company £50,000 a year in the payment of damages. How much saving in human suffering that fact represents can hardly be over-estimated. Councillor T. Canby, Huddersfield, said that the matter was one of national importance, and if the new rule were adopted it would be of great benefit.

Sir John Courtis, chairman of the Cardiff Corporation Tramways, proposed that the Home Office should be approached in the matter, and he was supported by Mr. H. W. Scott, Highways Committee, London County Council; Alderman C. F. Spencer, of Halifax; Councillor Bishop, of Walthamstow; and Councillor Heap, of Burnley. The discussion was concluded by the adoption of a resolution that the Home Office and the various local authorities should be urged to take action in the matter.

Mr. William Murray, manager Walthamstow Tramways, then briefly introduced his paper on the "Differentiation in Fares for Workmen and other Passengers on Tramways." The paper is a careful study of the question, and expresses views with which many will thoroughly agree, and it met with a cordial reception. Councillor J. Moon, deputy chairman, Plymouth Corporation Tramways, opened the discussion, and he was followed by Alderman Broadley, Halifax; Mr. W. J. McCombe, tramway manager, Hull; Mr. William Clough, general manager, Bury Corporation Tramways; Mr. Arthur Ellis, general manager, Cardiff Corporation Tramways; Councillor A. J. Bishop, Walthamstow; Mr. V. Fisher, general manager, Dundee Corporation Tramways; and Mr. W. J. Squires, London County Council, who said that he did not think halfpenny fares would come back in London. In his reply, Mr. Murray remarked that since Walthamstow had abolished halfpenny fares and substantially increased workmen's fares their traffic receipts had increased fully 2d. per car-mile.

A discussion on "The Development of Tramways" was opened by Mr. Arthur Ellis, city electrical engineer and tramways manager of Cardiff. Mr. Ellis looked forward to a great expansion of tramway facilities after the war, and insisted on the necessity of providing transit in suburban and rural districts so that people who lived off the main roads could reach the centres. Parliamentary procedure for obtaining powers for tramway extensions should, he urged, be simplified.

Mr. A. R. Fearnley, general manager, Sheffield Corporation Tramways, referred to the motor omnibus for the development of rural traffic. In Sheffield they had built up an omnibus traffic of 6,000,000 passengers per annum, with receipts amounting to £40,000. There was much to be done in encouraging the riding habit, and through-running and the inter-connection of systems were of great service to that end. Mr. N. J. Young, general manager, Newport Corporation Tramways, thought the time had come for the consideration of town planning and tramway development as part of a combined scheme. Alderman W. C. Fenton, vice-chairman, Sheffield Tramways Committee, said he believed in the American view that the provision of tramways brought population, and he urged a bold policy in tramway enterprise.

Mr. A. Baker, general manager, Birmingham Corporation Tramways, characterised the present method of Parliamentary control over schemes of local authorities as simply monstrous. Some less costly procedure ought to be possible. Alderman Spencer, of Halifax, alluded to the vital importance of goods traffic for tramways, both from a local and national point of view, and gave some important figures regarding goods haulage on Leeds tramways. Mr. A. H. Scott, London, spoke of the advantage that would result if agricultural products could be brought direct to markets by tramways. Mr. Ellis briefly replied to the discussion.

On Friday morning a meeting of the Executive Council was held, followed by a meeting of the Managers' Section, at which it was unanimously agreed to resume the managers' spring meetings, and that the next meeting should be held at Birmingham. Then followed an extraordinary general meeting to confirm

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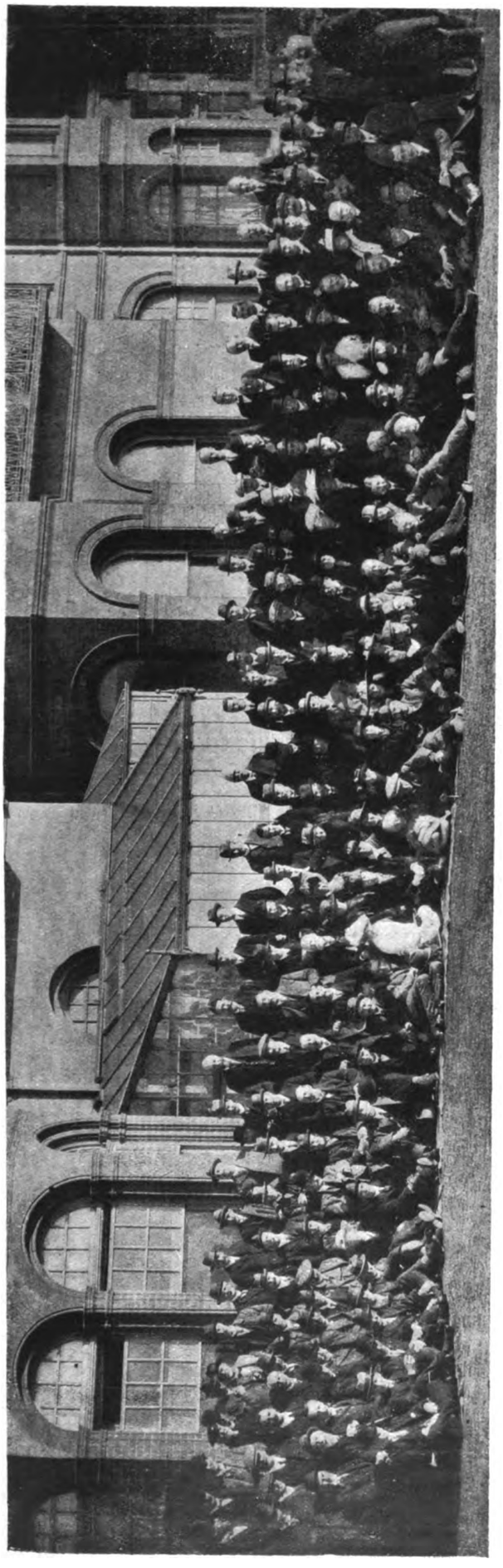

Municipal Tramways Association Conference at Blackpool.

certain alterations to the articles of association, of which particulars will be found in the full report which is given in the following pages. The most notable change provides for the appointment by the Council of a chairman of the Council who shall hold office for a year. This is a change that will undoubtedly be found a decided advantage. It will relieve the president from much work that can as well be performed by a chairman, and that in the case of a busy member of a Town Council might prevent his acceptance of the position.

At the annual general meeting a letter was read from Bailie Buist, convener of Dundee Tramways, inviting the Association to visit Dundee, an invitation that had been made during Mr. Peter Fisher's presidency of the Association. The letter was cordially received, and was referred to the Council.

The annual report, which will be found elsewhere in this issue, was adopted. It is a gratifying record of work done by the Council in a time of great stress and difficulty; and the Association is deeply indebted to the members who have found time, often at great personal inconvenience to themselves, to devote to matters which concern every municipal tramway in the country. Many, indeed, concern all tramway undertakings, and it is pleasant to note that the Municipal Tramways Association and the Tramways and Light Railways Association are working harmoniously together in all matters of common interest.

In their report the Council mentioned that Mr. C. J. Spencer, who had filled the position of hon. sec. for the past five and a half years, had, owing to the demands of Government work, been obliged to resign that position. Mr. A. R. Fearnley, who had occupied the position before Mr. Spencer, had resumed the duties *pro tem.*

The election of officers then took place. As previously mentioned, Alderman S. Flint, chairman Leicester Corporation Tramways, was elected president, and Mr. T. B. Goodyer, manager, Croydon Corporation Tramways, vice-president.

The following were elected members of the Council. Mr. A. Baker, general manager, Birmingham, Mr. J. M. McElroy, general manager, Manchester, Alderman R. Wood, chairman of the Stalybridge, etc., Tramways and Electricity Board, Councillor R. Mayne, J.P., chairman of Newcastle Tramways Committee, and Alderman C. F. Spencer, chairman of Halifax Tramways Committee.

The following are, therefore, the officers of the Association for the ensuing year:—

PRESIDENT.
Alderman S. Flint, J.P., Leicester.
VICE-PRESIDENT.
T. B. Goodyer, Croydon.
PAST PRESIDENTS.
H. Mozley, Burnley; P. Fisher, Dundee; Ald. H. Linsley, Salford.
COUNCIL.
A. Baker, Birmingham.
Wm. Clough, Bury.
Alderman Sir J. W. Courtis, Cardiff.
Jas. Dalrymple, Glasgow.
A. L. C. Fell, London.
J. B. Hamilton, Leeds.
Councillor E. Heap, Burnley.
G. W. Holford, Salford.
Councillor R. Mayne, Newcastle.
W. J. McCombe, Hull.
J. M. McElroy, Manchester.
Alderman C. F. Spencer, Halifax.
Alderman R. Wood, Stalybridge.
A. F. Lucas.
HON. SOLICITORS.
E. R. Pickmere, Town Clerk, Liverpool.
S. F. James, Town Clerk, Ilkeston.
HON. TREASURER.
C. J. Spencer,
General Manager, Bradford Corporation Tramways.
HON. SECRETARY.
A. R. Fearnley,
General Manager, Sheffield Corporation Tramways.

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A cordial vote of thanks was passed to the retiring president, Mr. Mozley. On the motion of Alderman Dunsford, chairman of Southampton Corporation Tramways, the conference passed a resolution expressing the thanks of the Association to the Blackpool Corporation, the Mayor, the chairman and members of the Blackpool Tramways Committee, Mr. Charles Furness (the general manager and engineer, Blackpool Corporation Tramways), Mr. John Cameron (manager of the Blackpool and Fleetwood Tramroad Company), and Mr. H. W. Laing (manager of the Blackpool, St. Anne's and Lytham Tramways Company) for the facilities and hospitality that had been accorded to the conference. Mr. Furness made a brief but happy reply, and the proceedings were shortly concluded.

The members of the conference were afterwards entertained to luncheon at the Metropole Hotel by the Blackpool Corporation, and subsequently a photograph of the company was taken in the grounds of the hotel.

arrangements were made with that usual attention to detail that the hon. secretaries and their assistant, Mr. F. W. Falkingham, have taught the members unquestioningly to expect. Much of the success of the annual meetings is due to the thoughtful arrangements that are always made, and the votes of thanks to those responsible for the plans were more than mere formal expressions.

The absence of two well-known and popular members of the Council was much regretted. Both Mr. J. M. McElroy and Mr. C. J. Spencer were detained by their duties in connection with their Admiralty appointments, and fitting references to them were made by the president. Both of them are among the original members of the Association, and this was the first conference at which they have not bene present. Mr. McElroy was re-elected to the Council, and Mr. C. J. Spencer was elected hon. treasurer, so that he remains *ex-officio* a member of the Council.

Cross-Bench Open Cars—Blackpool Corporation Tramways.

In the afternoon a visit was paid to St. Anne's in special cars, many of them of the cross-seat open type which Mr. Furness has used to such excellent advantage for "circular tours." A large number of these cars are in regular service, and they are greatly appreciated by the public. As the photograph indicates, the cars provide a handsome revenue for the department, the average earnings being more than 3s. per car mile. The fine new gardens and spacious open-air baths at St. Anne's were inspected, and tea was served at the latter, where the visitors witnessed an exhibition of the efficiency attained in the art of swimming and high diving by several well-known tramway managers. During their visit to Blackpool the delegates were provided with passes on all the tramways in the district, and many other hospitable arrangements were made for their comfort and entertainment. The hotel accommodation was ample, and the majority of the members were able to find rooms at the headquarters, the Savoy Hydro., the latest addition to Blackpool's hostelries. All

The pleasant impression of success which the conference created was enhanced, no doubt, by the agreeable weather which prevailed. Blackpool fully maintained its reputation for breeziness, but the bracing atmosphere was tempered by an agreeable mildness. Friday was a perfect day, and during the visit to St. Anne's the visitors were able to enjoy a sunset characteristic of Blackpool in the early autumn. The western light tinged with indescribable softness innumerable fleecy clouds floating high in a clear sky of deep blue, producing contrasts all the more charming because of their delicacy. Engagements called many elsewhere on the Saturday, but those who struggled through a crowded station could only hope that nature would continue her largesse to the genial band who remained over the week-end.

Conference Photograph.—Copies of the Conference photograph which is reproduced on the previous page may be obtained from Mr. R. W. Lord, 1, Chapel Street, Poulton-le-Fylde, at 4s. 6d. each.

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LIST OF DELEGATES PRESENT AT THE MUNICIPAL TRAMWAYS CONFERENCE.

Accrington... ... Councillor T. Morley, vice-chairman.
H. Pilling, general manager.

Ashton-under-Lyne ... Alderman R. S. Oldham, chairman.
Ernest Holt, general manager.

Belfast ... ... Alderman J. Tyrrell, J.P., chairman.
J. S. D. Moffet, general manager.

Bexley ... ... H. P. Stokes, general manager and engineer.

Birkenhead ... Councillor H. Halsall, chairman.
C. Clarke, general manager.

Birmingham ... Councillor H. Barrow, chairman.
Councillor J. Fryer.
A. Baker, general manager.

Blackburn ... ... Councillor C. Higham, vice-chairman.
J. H. Cowell, general manager.

Blackpool ... ... Councillor R. Holt, J.P., chairman.
Councillor H. Brooks, vice-chairman.
C. Furness, general manager.

Bolton ... ... Councillor Peter Higson, chairman.
Councillor T. Shepherd, member of committee.
John Barnard, general manager.

Bradford ... ... Councillor E. Priestley, J.P., chairman.
Councillor I. Akeroyd, vice-chairman.
J. W. Falkingham, assistant secretary M.T.A.
T. Stirk, traffic superintendent.

Burnley ... ... Councillor E. Heap, chairman.
Councillor D. D. Irving, vice-chairman.
Henry Mozley, general manager.

Burton-on-Trent ... A. B. Slater, general manager.

Bury ... ... Alderman T. S. Collinge, J.P., chairman.
Councillor H. Hargreaves, vice-chairman.
William Clough, general manager.

Cardiff ... ... Alderman Sir J. W. Courtis, J.P., chairman.
Arthur Ellis, engineer and manager.

Chester ... ... W. H. Ellis, superintendent.

Chesterfield ... R. L. Acland, general manager.

Colchester ... ... Councillor A. M. Jarmin, chairman.
R. C. Bullough, manager and engineer.

Colne ... ... T. G. Richardson, general manager.

Coventry ... ... Councillor H. W. Wale, J.P., vice-chairman.
Councillor M. K. Pridmore, J.P., member of committee.
T. R. Whitehead, general manager and engineer.

Croydon ... ... Alderman G. J. Allen, J.P., chairman.
T. B. Goodyer, manager.

Darlington ... Alderman Sir Charles Starmer, chairman.

Darwen ... ... F. J. S. Hosken, general manager and engineer.

Dundee ... ... Bailie Buist, chairman.
Peter Fisher, general manager and engineer.

East Ham ... Alderman Murrell Oakes, J.P., chairman.
W. C. Ullmann, engineer and manager.

Erith ... ... Councillor G. C. Humphreys, chairman.
J. C. Williams, engineer and manager.

Glasgow ... ... Bailie M. W. Montgomery, chairman.
James N. Wilson, secretary and treasurer.

Halifax ... ... Councillor C. F. Spencer, chairman.
Alderman A. Fawcett, vice-chairman.
Councillor A. Broadley, member of committee.
Councillor A. Seed, member of committee.
J. D. Caird, traffic manager.
J. W. Galloway, tramways engineer.

Huddersfield ... Councillor E. H. Sellers, chairman.
Councillor T. Canby, vice-chairman.
R. H. Wilkinson, general manager.

Hull ... ... Councillor W. Hakes, chairman.
Councillor C. Raine, J.P., vice-chairman.
William J. McCombe, manager.

Ilford ... ... Councillor O. Waters, chairman.
Councillor J. Lowe.
L. E. Harvey, engineer and manager.

Keighley ... ... Councillor Albert Smith, chairman.
Harry Webber, general manager.

Kirkcaldy ... Councillor G. Fergusson, chairman.
O. F. Francis, engineer and manager.

Lancaster ... ... Councillor T. Wilkinson, chairman.
J. B. Patterson, acting borough electrical and tramway engineer.

Leeds ... ... Alderman R. A. Smithson, chairman.
Alderman H. Brown, vice-chairman.
J. B. Hamilton, general manager.
A. Daggett, traffic superintendent

Leicester ... ... Alderman S. Flint, J.P., chairman.
Alderman G. Banton, J.P., vice-chairman.
A. F. Lucas, manager and secretary.
T. R. Smith, electrical engineer.

London County Council ... ... W. J. Squires, J.P., vice-chairman of the Council.
A. H. Scott, J.P., vice-chairman Highways Committee.
A. L. C. Fell, general manager.

Lowestoft ... ... Herbert H. Saunders, general manager.

Maidstone ... ... A. T. Lambert, general manager.

Manchester ... Alderman J. Bowes, J.P., chairman.
Alderman A.W. Chapman, M.D., vice-chairman.
James Wood, deputy general manager.

Nelson ... ... Councillor W. F. Cooke, chairman.
G. F. Nayler, manager and engineer.

Newcastle-on-Tyne ... Councillor Richard Mayne, J.P., chairman.
Councillor S. T. Taylor, member of the committee.
Ernest Hatton, general manager and engineer.

Newport ... ... N. J. Young, general manager.

Northampton ... Councillor T. D. Lewis, chairman.
John F. Cameron, general manager.

Oldham ... ... Councillor J. K. Cheetham, chairman.
P. Priestly, general manager and engineer.

Plymouth ... ... Councillor J. Moon, vice-chairman.
C. R. Everson, general manager.

Portsmouth ... Councillor J. Timpson, chairman.
Alderman R. Payne, vice-chairman.
W. R. Spaven, general manager.

Preston ... ... Alderman J. Ormrod, chairman.
Councillor T. Parkinson, vice-chairman.
J. F. Simpson, engineer and manager.

Rawtenstall ... C. L. E. Stewart, general manager and engineer.

Reading ... ... Alderman C. G. Field, J.P., chairman.
G. F. Craven, general manager and engineer.

Rochdale ... ... Alderman James Taylor, chairman.
George Webster, manager and engineer.

Rotherham ... Councillor T. Reeves, vice-chairman.

Salford ... ... Alderman H. Linsley, J.P., chairman.
G. W. Holford, general manager.

Sheffield ... ... Alderman W. C. Fenton, vice-chairman.
Alderman J. Knowles, chairman of engineering sub-committee.
A. R. Fearnley, general manager.

Southampton ... Alderman F. A. Dunsford, J.P., chairman.
W. T. Robson, general manager.

Southport ... Alderman T. P. Griffiths, J.P., chairman.
Councillor Clayton, vice-chairman.
Thos. J. Kendrew, general manager.

South Shields ... Alderman W. G. Wylie, chairman.
Councillor J. G. Winskell, vice-chairman.
J. C. Whiteley, general manager.

Stalybridge ... Alderman R. Wood, chairman.
Frank Schofield, commercial manager.

Stockport ... ... Alderman Charles Staples, chairman.

Wallasey ... ... Councillor F. E. Howse, chairman.
R. R. Greene, general manager.

Walsall ... ... R. L. Horsfield, general manager.

Walthamstow ... W. R. Clarke, chairman.
R. J. Bishop, vice-chairman.
W. Murray, manager.

Warrington ... J. Telfer, general manager.

West Ham ... Alderman R. Mansfield, J.P., mayor.
Councillor George Kensett, chairman.
L. Slattery, general manager.

Wigan ... ... Alderman R. T. Fletcher, chairman.
Councillor Jas. Walkden, vice-chairman.
Alderman E. Dickinson.
F. Buckley, general manager.

Wolverhampton ... C. Owen Silvers, general manager and engineer.

York ... ... J. W. Hame, general manager.

There were also present the following : —

Mr. H. E. Blain, operating manager, Underground Railways and London General Omnibus Company.

Mr. W. G. T. Goodman, chief engineer and general manager, Municipal Tramways Trust, Adelaide, and President of the Tramways Association of Australia.

Representatives of the Tramways and Light Railways Association.

Mr. H. W. Laing, general manager, Blackpool, St. Annes and Lytham Tramways Company, Limited.

Mr. J. Cameron, general manager, Blackpool and Fleetwood Tramroad Company.

Mr. H. England, general manager, Yorkshire (West Riding) Electric Tramways Company, Wakefield.

Mr. E. H. Edwardes, general manager and engineer, South Lancashire Tramways Company.

Mr. A. E. Paris, managing director, Yorkshire Woollen District Electric Tramways Company.

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THE OPENING PROCEEDINGS.

The 16th annual general meeting and conference of the Municipal Tramways Association (Incorporated) took place in Blackpool on Thursday and Friday, September 20 and 21 last.

Mr. Henry Mozley (general manager, Burnley Corporation Tramways) the president of the Association, occupied the chair, and asked the Mayor of Blackpool to say a few words to the delegates.

The MAYOR OF BLACKPOOL (Mr. A. L. Parkinson) said.—It is a great pleasure to give you a welcome in the name of the inhabitants of Blackpool on the occasion of your 16th annual conference. In 1907 we had the Conference of the Municipal Tramway Managers in Blackpool; in 1911 we had a visit of the Lancashire and Cheshire Tramways Association, in 1913 a visit of the Tramways and Light Railways Association, and now in 1917 we have the Municipal Tramways Association here. We have therefore had a fair number of conferences representing different systems of tramway undertakings. I know that the tramway managers and the chairmen of tramway undertakings always believe in business first and pleasure after. You have met at a time when you will have to take into consideration whether the Association will not have to ask Parliament to give them some little grant or a recognition of a revision in fares. I believe that there are 16 tramway undertakings which are not able to turn the corner in regard to any surplus. That means that, if they have to carry on, with the increased wages, cost of material, etc., they are going to be in a very depleted state. There are 20 systems whose surplus profits do not exceed 6d. per 100 passengers, or ·06d. per passenger. If these undertakings belonged to public companies they would be working at a loss if they had to replace any of their worn out material at increased prices. We know that after the war the original prices will not come back. Your deliberations I hope and trust will proceed in the spirit which has characterised your previous conferences, and I hope that much good may result. It is by the brains of the country meeting together, reading papers and criticising, that we get so much help for the undertakings throughout the country. We in Blackpool, of course, do not need to say much about our tramway undertaking, because, as most of you know, we have a big surplus profit every year. That largely arises because of the number of visitors who come here to enjoy the fresh air and the bracing breezes. I believe also from our experience that the more tramway undertakings you can get in outlying districts the better it is for the town. In our case the tramway system was laid out so as to go round the outlying districts, and the profit that has been made by building has repaid the town many times over. (Hear, hear.) I hope much good may come from your meeting, and on behalf of the Corporation I have to invite you to lunch to-morrow with the Tramways Committee. (Applause.)

The PRESIDENT.—I am sure I shall be expressing the feelings of the conference if I say that we give a hearty vote of thanks for the kind words of welcome from the Mayor of Blackpool, and also for the very useful and appropriate remarks which he has made in regard to the tramway position. (Applause.)

The MAYOR OF BLACKPOOL.—I thank you for your vote and hope we shall see you all at lunch to-morrow.

The PRESIDENT.—We are very fortunate in coming to Blackpool, and in view of the numbers present I think the decision of the Executive Council to hold a meeting here is fully justified. I have to express the welcome of the conference to gentlemen from different undertakings, and especially to those I am now going to name:—Mr. Goodman, general manager and engineer of the Adelaide Municipal Tramways Trust, who is also president to the Tramways Association of Australia (applause); and our old friend Mr. Blain, of the London General Omnibus Company, and also members of the Tramways and Light Railways Association and of the Incorporated Municipal Electrical Association. We give these gentlemen a hearty welcome and shall be very pleased if they will join in the discussion and assist us in any way they can. I have a letter of apology from Mr. McElroy. He has been, as you know, a member of the Association since 1902 and this is the first occasion on which he has been unable to be present. He is now recuperating in Devonshire, and I do not blame him for staying away from our conference, as I think he is doing more good to himself, but still I feel his absence, and I have no doubt that is the experience of all of you. We hope his visit to Devonshire will do him good. Mr. Spencer, of Bradford, unfortunately cannot be here. He is on Government work and we know, owing to the state of the country, that he is better engaged perhaps than if he were here. I ought to mention Mr. Dalrymple, because he has been put down to discuss a subject, and he is also one of our most useful members. As you all know, the King is in the North and it would not be right for the Tramways Manager of Glasgow to be absent on that occasion. I will now proceed to read my address, and I hope you will be patient with the views I may express. I will accept any challenges after the conference on any subject with which I may deal. I have, as you know, certain weaknesses which I cannot always overcome.

PRESIDENTIAL ADDRESS.

BY HENRY MOZLEY
(*General Manager, Burnley Corporation Tramways*).

One of the duties connected with the office of president which I have the high honour to fulfil is to address the members at the Annual Conference upon subjects which appertain to the special department of municipal activity represented by Tramway Committees and their managers, and I do so upon this occasion with a certain amount of diffidence because my long connection with the industry necessarily brings with it certain pronounced opinions developed by experience which are not always welcomed by the men who are growing up in the industry, but who nevertheless, I am sure, appreciate any effort to help on the good work of developing and perfecting the working and management of tramways.

First let me say a word in favour of this Association, which has performed great and useful duties in the past, but which, I am convinced, has a much more important future in store, believing, as I do, that the development of the tramway and now also the omnibus industry has not by any means reached its highest expansion in this country. On the contrary, it must be within the knowledge of all our members that in each of our areas there are local branch lines or connecting lines with other districts which are waiting only for an enterprising municipality to bring about their construction and consequent benefits to the community. The practically total suspension of new construction brought about by the war we may hope will cease within a reasonable time, and until this happy moment arrives this Association can and must prepare for the great and inevitable changes which will occur in the new world to which we are all looking forward.

Ever since my introduction to municipal life I have felt what an absurdity it is to repay the whole capital, within very limited periods, of an industry like that of the tramways, which is ever growing in value, at least those undertakings which have been wisely laid out and properly developed. Why should the first generation of inhabitants make a present to the second generation of property bringing in thousands a year, when this can only be done by burdening themselves with heavy charges annually instead of taking a legitimate toll or dividend for the monies expended? I suggest the policy of municipal authorities providing sinking funds for everything alike, whether for a pure business undertaking such as a tramway or works necessary for the conveniences of life, such as streets, sewerage, parks, etc., is wrong, and although it may be law it is the business of this Association to get the law altered, and I suggest this subject as one deserving of early attention.

Certain undertakings have felt the inconvenience of the sinking fund during the war especially, but there does not appear to be any prospect of temporarily obtaining powers to suspend the charge, with the consequence that the rates have become liable, and this naturally leads to the consideration of fares and their effect on the financial position. This is a subject which this Association can very usefully consider. Unlike the railway companies, municipal authorities after securing certain statutory fares began to give very much cheaper fares both for workpeople and ordinary passengers, and at present in some cases this policy is being continued with disastrous consequences to the financial stability of the undertaking. This Association can and should exert its influence to help such undertakings to remedy such errors, and secure more uniformity in charges. It is the common experience of all to have flung at them such remarks as "Such and such a tramway gives three miles for a penny, why can't you?" Probably it would be useless to tell the person that the cost of carrying a passenger three miles is considerably in excess of one penny, and that the loss is made up from the shorter journey passenger. It would be better before taking any steps to secure legislation for the undertakings concerned to put into operation the power they already possess of increasing fares, and by open discussion at our meetings healthier and more reasonable views may be created, and thus help to conserve the reasonable fares in operation and to increase such as are unreasonable.

In recent years the tramway industry has benefited by standardisation of material used in common, and in the immediate future we may hope for further help in this direction, but there is a local standardisation desirable, that is to say, for convenient and economical working all cars should be alike in design and dimension on separate undertakings, and in the case of those with connections with neighbouring tramways and light railways not only would more economical working be secured, but interchange of rolling stock facilitated, and neighbouring tramways might thus assist each other in ordinary development and emergencies. How common it is to find cars of design and dimensions differing materially on the same undertaking as well as on neighbouring systems! If the Association could do anything to ascertain the best type and most economical car to use, it would confer a great benefit on the industry in the way of cheaper working and convenience in operation. As time goes on and inter-communication is developed this question will become very important.

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From time to time we hear of difficulties and inconveniences arising owing to the long period which has elapsed since the Tramway Act of 1870 became law, and I suggest that it should be made the business of this Association in combination with the association representing company undertakings, to take up the revision of the conditions brought about by that Act, and secure more liberty in carrying on the tramway business. There should be one tramway authority in combined areas to control all traffic problems and developments with representative boards. Every one must be conscious of the incomplete effect of a number of small undertakings operating in what is practically the same district, whereas, if combined, the result would not only be more economical working but a greatly increased convenience to the public. In these days of manufacturing syndicates, what an advantage it would be if combined tramway undertakings could buy their material in bulk, also why should there be any restriction as regards manufacturing for one's own requirements—either cars, working parts, or other material in daily use? The power to do this should be secured by law. But I need not further enlarge here on the amendments in the Act of 1870 which are desirable, but throw out the suggestion that the Association should give immediate attention to the subject.

In common with the rest of the business community, it behoves us to prepare for the great changes which are bound to come after the war. Amongst other subjects the questions suggested by the Whitley Report issued by the Reconstruction Committee should receive the immediate attention of the Association. Here at least we are in a position to carry out without delay one of the principal recommendations, viz. :—

> "That the establishment for each industry of an organisation representative of employers and workpeople, to have as its object the regular consideration of matters affecting the progress and well-being of the trade from the point of view of all those engaged in it.",

Our organisation being national, and areas being provided in most cases with local associations, we have only one step forward to take, that is to invite representatives of the workpeople to share our conferences and responsibilities.

There must be some better way of arriving at agreements for working conditions, wages, etc., than the present inequitable and slow one. Agreements amongst ourselves are better than the impositions of an outside and unsympathetic authority, which can only consider tramways in the lump, and which is bound to disregard the local conditions of individual tramways.

Having pointed out what I consider to be work of importance for the future, the past history of the Association deserves a word of commendation. I claim that although the Association is comparatively young a very large and important work has been accomplished in the past, and this is not merely traceable in our records, but everyone who has attended the conferences must be aware of the useful knowledge obtained by mere contact with men engaged in similar work by the exchange of notes and the willingness to help one another in all manner of ways which cannot be detailed in journals.

I have been attending conferences for more years than I care to remember, and have always been able to pick up some information in one form or another which has helped to render my work easier and better, and I have no doubt that that is the experience of all; therefore I hope that notwithstanding the times in which we have our present being, we shall continue the good work of meeting annually, and if it were better understood the managers' section would resume their annual conferences, which have now been suspended for three years. There must be large arrears of technical matters to consider which are unsuitable for public discussion; for instance, the costly brake inquiry and report has not yet been discussed.

One word more. During the past year, as the report of the Executive Council will show, a vast amount of business has been transacted of the highest importance to the industry, and I have to thank those members of the Council and the hon. secretaries for their helpful support during my year of office. Owing to the exigencies of Government we have lost the help of at least four important members of the Executive Council, viz., Messrs. Hamilton, McElroy, Spencer, and Clough, who were called upon early in the year to assist the Admiralty in an important department of its activities. It is no small honour to this Association that it should be privileged to help the Government, and it confirms the choice we have made in the past of eminent men to serve on our Executive Council.

In conclusion, I might say it will always be a source of pride to me that I was privileged to occupy this chair, the highest honour which the Association can bestow.

Mr. Henry Mozley,
President, Municipal Tramways Association.

VOTE OF THANKS TO THE PRESIDENT.

Alderman S. FLINT, J.P. (chairman, Leicester Tramways Committee).—I have pleasure in moving a hearty vote of thanks to our president for the interesting paper he has read to us. It has proved practical and business like, and very appropriate to the conference. Many of the questions he touched upon we should like to discuss, but that is forbidden, as the president's addresses are never discussed in our conferences. I notice, however, that several points which he has mentioned are coming up later on for debate. The address is just such a one as we should have expected from the president—no words wasted and just touching lightly and briefly on various points, but each point of practical interest at the present time. We all owe him a very considerable debt for his paper, and I move that our hearty thanks be expressed.

Alderman W. G. WYLIE (chairman, South Shields Tramways Committee).—It is my pleasure to second the motion for a vote of thanks to our president. We have heard his address with great pleasure, and if there is one man in the Association who can address the company as a tramway man it is our chairman, owing to his long experience of tramway matters. The items touched upon are most important and interesting. Some of them appeal to me very strongly, as they do to you. (Applause.)

Mr. J. B. HAMILTON (general manager, Leeds City Tramways).—May I say a word in support of the motion? I should like to thank the president on behalf of my colleagues in the Admiralty for the very kind references he has made to our work. I can assure you from those who are unable to be present that it is with the deepest regret they find themselves so situated that they cannot be here. Both Mr. McElroy and Mr. Spencer were original members of the Association, and they look forward to the meeting of the conferences as bright days of the tramway year. I note now the presence for the first time at our conference of ladies. I take it is an augury of that wider and, perhaps, more useful sphere which ladies in the future are to occupy in the work of the world. I have no doubt, if we are spared long enough, we shall see a mixed conference of lady managers and gentlemen managers. (Laughter.) Those of us who are married know how much the ladies have assisted us in carrying out our work. In fact, we are the mere figureheads to be moved as required. I rose principally for the purpose of drawing attention to the fact that ladies were present, so that gentlemen might moderate their language accordingly. (Laughter.)

The motion was unanimously agreed to.

The PRESIDENT.—I thank you very much. We will now proceed with the first discussion. The first paper is "Notes on Tramway Finance," by Messrs. Barnard, Holford, and Priestley. You will see that in future, papers are only to be submitted and a synopsis given by the authors, unless the writers desire to read the papers in full. I think the most convenient course will be for one of the three authors of this paper to give us a synopsis, as we have a great deal of business to get through.

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NOTES ON TRAMWAY FINANCE.

MESSRS. J. BARNARD (*Bolton*), G. W. HOLFORD (*Salford*), and P. PRIESTLY (*Oldham*).

When the suggestion was first made by our worthy President that the title of our remarks might be "What are the principles which should ensure the highest net earning capacity of a municipal tramway undertaking?" we decided that this was somewhat too serious a question to reply to without considerable time for deliberation and thought. As you are all aware, under the abnormal conditions through which we are passing leisure hours are almost an unknown quantity not only for tramway managers but for all those engaged in tramway work. We have not therefore ventured to answer the query in a direct manner, but called attention to what may be termed the main features of the "income" and "expenditure" sides of our various undertakings, hardly in the nature of a "paper" in the usual understood sense of the term, but merely as points of interest which may result in an interesting discussion.

We will first refer to the "income" side of our accounts, and suggest that the following are usually the principal sources of revenue upon which depend to a very large extent our financial success or otherwise, namely:—

1. Tramway fares.
2. Parcels.
3. Advertising.
4. Investments, etc.

It will be found desirable to deal with the above items *seriatim*, namely:—

1.—TRAMWAY FARES.

These may be sub-divided into

(*a*) Fares for ordinary passengers.
(*b*) Fares for workmen, etc.
(*c*) Children's fares.

(*a*) *Ordinary Passenger Fares.*

In dealing with the fares charged to ordinary passengers we have to consider that the usual rate stipulated in the Acts of Parliament is fixed at 1d. per mile (there are exceptions, no doubt, which will be mentioned by members present), and we are aware, particularly in some of the smaller undertakings, these rates are already in operation. How, then, can their revenue be increased? Some may suggest that if the fares were cheapened there would be more riders. This may result to a limited extent, but it is not always an easy matter to cheapen a 1d. fare successfully, as usually there are only two alternative methods of carrying this out. First, to reduce the penny stage to a halfpenny one (which is an arrangement we are most strongly opposed to), or, secondly, to extend the stage. In either case a considerable increase has to take place in the number of passengers carried before the previous revenue is obtainable, and it is more a matter of local knowledge of the several undertakings as to the probability or otherwise of a sufficient increase of passengers taking place as would ensure a larger revenue. What other method is then open to these undertakings under the present restrictions contained in the Acts of Parliament? There does not appear to be one, but if Parliament can be induced to raise the rate per mile chargeable by tramway operators then there is a possibility of larger revenue being obtained. This matter is at the present time receiving attention at the hands of the Executive Councils of both this Association and the Tramways and Light Railways Association. Many tramway undertakings, who were charging less than the statutory limits, have increased their fares in view of the additional expenditure prevailing, necessitated by the abnormal conditions. In most cases the authors understand the results have been of a satisfactory character. Each undertaking will no doubt carefully consider local circumstances before taking a similar course; but as almost every commodity has increased in cost there does not appear to be any reasonable objection to tramway operators endeavouring to meet their increased expenditure by adopting this principle.

(*b*) *Workmen's Fares, etc.*

The general basis of charge allowed by Act of Parliament for workmen's fares stipulates that during certain hours of the morning and evening workmen shall be carried at fares not exceeding ½d. per mile, but usually the operator is not called upon to charge a less fare than 1d. Many undertakings to-day are charging workmen's fares at the highest possible rates allowed. In their case it would seem almost hopeless to increase the revenue from that source unless the amount allowed to be charged under statute is increased. Some undertakings have endeavoured to obtain custom by offering a cheaper rate of fare if the passenger will purchase a "return ticket," but in our opinion very little benefit is being obtained in this direction for the revenue of the undertaking, and, in fact, in many cases the action results merely in giving to the rider a concession which is very rarely justified, as in most cases the passenger would use the car even if he had to pay the single fare for each journey. It is, moreover, an arrangement which offers much scope for abuse, and generally does not work in a satisfactory manner. In these cases we suggest that a review of the concessions allowed would undoubtedly be of benefit to the undertakings interested.

Other undertakings are allowing workmen and early morning riders to travel at cheaper rates than those stipulated in the Acts of Parliament. If the balance sheets of these undertakings are showing reasonable profits, then perhaps the action of the committees in charge may be justified, but if not, then we submit that they should revise their charges so as to agree with those provided by Act of Parliament. Even where a profit is being shown in the general working of the undertaking, it may be found on close investigation that the "early morning" passengers are actually being carried at a loss, and the passengers paying the usual rate of fare are contributing to make up this loss. Again, in other towns no distinction is made between the fares charged to workmen and early morning riders and those charged throughout the day. Of course, in these cases it must follow that the fares charged throughout the day are not higher than those provided by law for workmen's fares; and again, if the financial results at the end of the year are satisfactory, this system will no doubt be continued.

(*c*) *Children's Fares.*

The system varies in numerous undertakings with regard to the age limit for children's fares. In some instances these fares are on too liberal a scale, and would well repay revision. We submit that a general principle would be to allow children under three not occupying a seat to travel free; if occupying a seat, half-fare; and half-fare to all children between the ages of three and twelve years.

Many concessions of varying character have been granted in tramway undertakings in the past in the shape of contract tickets, pre-paid tickets, etc. In some cases the privileges have been granted in response to appeals from various sections of the community, and in others have arisen from a rather too generous spirit on the part of the Tramways Committees concerned. The authors are of opinion that it is not in the interests of a municipal tramway undertaking to encourage the granting of privileges or concessions to any section or class of the travelling public, and in many instances revenue would be increased if these concessions were withdrawn and the proper scale of fares enforced.

2.—PARCELS.

A number of undertakings are obtaining revenue from the carriage of parcels. In some cases the work is of an extensive character, and in others very limited.

It is difficult to suggest a method by which the revenue under this heading can be increased, as the prices chargeable are usually fixed under bye-laws or other regulations, but in undertakings where the carriage of parcels has not been attempted there may be additional revenue obtainable provided the working expenses are kept as low as possible and the local conditions are favourable. The revenue derivable from this source is largely influenced by the fact or otherwise of an undertaking being in close proximity to one or more undertakings already having a parcels carrying system. As some parcels systems are practically "semi-subsidised," i.e., by having the use of cars, omnibuses, etc., a proportion of the cost of which is not usually debited to the parcels account, it is questionable whether these parcels systems are actually profitable, even when they show a credit balance. The fact should, however, not be lost sight of that although revenue may be derived the undertaking may be suffering indirectly by the motormen or conductors having their minds diverted from the proper carrying out of their duties of driving the car or collecting fares, by reason of the frequent stopping of the car to collect or deliver parcels.

In some cases additional revenue has been gained by charging passengers for all excess luggage. This system does not involve any extra expenditure, and can be carried out by the conductors in their ordinary course of duty.

3.—ADVERTISING.

This source of revenue is not common to every undertaking. Considerable difference of opinion exists in many towns as to the wisdom or otherwise of utilising tramcar vehicles for advertising purposes. Certainly the vehicle is deteriorated to a material extent when metal advertisement signs are fixed to it, and its appearance is not improved even by advertisements which are painted on the side-boards, etc.

To those who advertise the period we are passing through offers very little prospect of higher revenue being obtainable. To those who do not allow advertising there may be opportunities of increasing revenue, but certainly the present is not the time when the best results can be expected.

We have no doubt there will be present advocates both for and against advertising.

From the experience of the authors it has been found that the value of a tramcar as an advertising medium has been on the down grade for several years, as shown by the reduced offers for advertising rights, and on general principles is not one to be commended.

4.—INCOME FROM INVESTMENTS.

This is an item which is hardly controllable by the management of an undertaking.

Much depends upon the system in operation in the various cities and towns. In some cases the interest accruing from invested funds is credited to the general fund account of the Corporation, in others

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to the revenue account of the tramway undertaking, and again in other cases to a particular fund, e.g., depreciation, renewals, etc., so that opportunity for obtaining a measure of increased revenue from this source appears very limited. We are firmly of opinion that the tramway fund should be credited with all the interest accruing from its investments, and consider it is a matter which would repay a careful investigation.

Having touched upon the principal items of "income," we will now turn to the main items of "expenditure," and these are included generally under the following headings, namely :—

1. Power.
2. Traffic.
3. General.
4. Accident insurances, etc.
5. Repairs and maintenance.

1.—Power Expenses.

This item in our accounts is of a very important character, not only with regard to the consumption of current per car-mile run but also as to the price paid for the supply of electrical energy, or the cost of production in undertakings where the generation of the energy is in the hands of the tramways department. With respect to the consumption per car-mile it should be an endeavour (and we believe it is in every undertaking) to keep this as low as possible. We find, however, that it is of a very varying character. Frequently, under apparently exactly similar conditions, the consumption may become higher or lower. How is this accounted for? No doubt most of us have had interesting discussions from time to time with the powers that be with not always satisfactory results. We know that when we compare the consumption per car-mile between different undertakings many factors have to be taken into consideration, such as the system of feeding, the type and weight of cars used, the number and degree of gradients, the type of electrical equipment, the length of service of the motormen, and many others.

In many undertakings the arrangements with regard to the price charged by the electricity department to the tramways department appears to be of a somewhat unfair character, the tramways department having to bear the cost of cables and all losses of transmission from the generating station to the section boxes, as compared with the method of charging manufacturers, who are not usually called upon to bear the cost of cables, and further, are charged for the current consumed as registered in their works, which relieves them of transmission losses, and frequently the actual price to be paid is lower than that charged to the tramways undertaking.

In other instances, where the feeder cables are the property of the electricity department, considerable economy could be obtained if the feeding arrangements were improved, but as this means an additional expenditure for the extra cables, the department supplying the energy is generally loth to increase their capital expenditure with the probable result of reducing their income. Some arrangement might be arrived at between the two departments whereby this expenditure could be shared, and the ultimate result would be beneficial to both departments.

With the present high price of coal it is hardly the best time for tramways departments to approach the producers of their electrical energy for reduced charges, but it is submitted that as soon as the price of coal begins to cheapen the price of electrical energy should be reduced in many undertakings, and we are satisfied that in fixing such price a sliding scale with regard to the price of coal should be provided for.

When we consider the effect of the type and weight of cars used, it is only reasonable to expect that if we add top deck covers to our cars, or purchase cars of a heavier type than those previously in use, the consumption per car-mile will increase. We are also aware that in towns where the gradients are of a serious character the energy used must be greater per car-mile run, etc.

As regards the human element, it is a fact that the experienced and careful motorman can and does save in the use of electrical energy. A new driver naturally takes considerable time to accustom himself to the stopping stations, to the amount of energy required on various sections, to the coasting up to compulsory stations, etc., all of which, though small matters in themselves, when multiplied by an extensive car-mileage, may mean serious additional expenditure. Careful watching on the part of experienced inspectors will often be found very beneficial in reducing this waste to a minimum. Systematic examination of the electrical equipment of the cars is an absolute necessity. Unfortunately, with the dearth of labour now experienced, it has not been possible on all undertakings to carry this work out in the desired manner, but it is of so important a character that no time ought to be lost immediately things become more normal in thoroughly overhauling all electrical and mechanical working parts of the car equipments to see that no unnecessary consumption of electrical energy is possible due to defective or worn equipments.

To those who have not already adopted car meters we strongly recommend their use, having practical experience of their great value in checking the excessive use of current on the cars. It should be noted that the best results can only be obtained if the records of each car and each man are carefully registered and studied from time to time. Indifference in this respect entirely nullifies the value of the use of the car meters.

Having dealt at some length with this item of exenditure, we will now refer to the next one on the list, which is also of a most important character, viz. :—

2.—Traffic Expenses.

Under this heading are grouped many items of expenditure which are familiar to most of us, namely :—Wages of traffic employees, cleaning and oiling of cars, the salting and sanding of track, fuel and lighting of depots, ticket check, uniforms, etc. These items usually represent the largest proportion of the expenditure of a tramway undertaking, and occupy the careful attention of every tramway manager. The rates of wages to be paid to the several branches referred to are not, and very properly so, matters to be left to the decision of the management, but are usually decided by the committee in charge, and are arrived at for different reasons and by varied methods. It is hoped that in the near future some system of standardisation of wages will be brought into operation which will control the rates to be paid in various areas, and so remove the numerous differences that exist in wages paid to men carrying out similar work under practically similar conditions, and if differences arise then we ought to be in a position to take such differences before a properly constituted authority appointed for the various localities, which should have power to settle the matters in dispute. At the present time practically all undertakings are burdened with large payments in respect of war bonus, but it is earnestly hoped that some relief may be experienced with regard to this expense as soon as the war ceases. The only economy that suggests itself in dealing with wages is that each undertaking carefully observes that no more labour is employed than is absolutely necessary, lists of spare men, stand-by men, etc., being kept at the lowest limits. With respect to material for cleaning and oiling cars, and salting and sanding track, it is admitted that at the present time we are called upon to pay abnormal prices, and the only way to meet this expenditure is by reducing the quantities used to as low a figure as possible. The adoption of inferior qualities is not in our opinion a true economy. Similar remarks apply equally with regard to the materials required for salting and sanding of track, for fuel, etc., for depots, tickets and uniforms. No doubt early after the termination of the war prices will begin to fall, but probably will not again reach the level of pre-war rates.

3. General Expenses.

This heading includes many items which are not controllable by the management, such as rates and taxes, insurance charges, etc., and due economy in other directions, such as printing, etc., is no doubt practised in all undertakings.

4. Accident Insurances, etc.

The method of dealing with claims arising out of accidents differs in various undertakings. Some undertakings carry their own risks, whilst others prefer to pay premiums to insurance companies to relieve them of their liabilities. We are of opinion that in the main it will be found more economical and certainly more satisfactory for the undertakings to carry their own risks. Certain undertakings pay bonus to employees for freedom from accidents, and probably members who have adopted this course will testify as to its beneficial result or otherwise.

5. Repairs and Maintenance.

This is an important item in our expenditure account, including, as it usually does, repair and maintenance of permanent way, rolling stock, overhead equipment, and sundry other plant and vehicles. In dealing with the labour side of this subject we have (as in the case of traffic expenses) to meet abnormal expenses for war bonus to the different trades engaged. It is not probable that any reduction will take place during the war, but possibly even further increases may be allowed, so that again it is desirable to reduce the work as far as possible, having due regard to the necessities of each case. Materials are, of course, excessively dear to purchase, and we can only again meet this difficult problem by practising the utmost economy in the quantities to be used. A considerable amount of work on the permanent way is held up at present, but must be carried out in the near future, and due provision should be made to meet this expense.

Having reviewed at considerable length both the income and expenditure account of tramway undertakings, our general conclusions may be summarised under the following headings :—

1. That increased revenue may be obtained—
   - (*a*) By an alteration—if Parliament or the Board of Trade will permit—in the maximum charges fixed by statute for the carriage of passengers; this applies where the undertakings are already charging statutory rates.
   - (*b*) That in other undertakings further revenue may be obtained by increasing the fares charged, and abolishing all forms of concessions and privileges.
2. That expenditure can only be reduced—
   - (*a*) By the employment of the minimum number of employees required, and by the utmost economy in the quantities purchased of the materials necessary for the reasonable maintenance of the various branches of tramway undertakings.

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(*b*) By a careful review by each undertaking of the several items referred to in our previous remarks which may offer opportunities for reducing expenses in particular instances, and that municipal tramway undertakings should at all times be regarded as commercial enterprises, and be dealt with strictly on these lines, and that provision should invariably be made for depreciation and renewals on sound financial basis before contributions are demanded from the undertaking towards relief of rates or for any other purpose.

THE DISCUSSION.

Mr. G. W. HOLFORD (general manager, Salford Corporation Tramways) read a brief summary of the paper, which is given in full above.

Alderman C. F. SPENCER (chairman, Halifax Corporation Tramways).—It is with pleasure that I rise to open a discussion on matters of finance which must be of absorbing interest and engaging attention to every one in this audience. This paper has a very expressive and expansive title, and in these days when national finance is of a very complex character, and sometimes of a critical character, tramway finance must, to a limited extent, be irretrievably and indissolubly bound up with it. When I read this paper once I decided to read it twice, and when I had read it twice, I decided to read it a third time. After the third time I came to the conclusion that it was more notorious for what it did not say than for what it did say. Sometimes our papers are all of a more or less academic interest, but this paper is of a provocative character, which will enable us to have a discussion of a lively character. The observations I have to make deal, perhaps, on a broader plane than those which characterise the paper. I would put them in eight headings for discussion :—(1) The question of national finance and how it affects municipal finance ; (2) the rising wages costs ; (3) the increase in material costs ; (4) the increase in income from fares ; (5) the reduction of electrical power costs ; (6) the expense of Parliamentary procedure ; (7) weakness and strength of municipal administration ; (8) new adoptive policies.

Finance to-day is of an exceedingly complex character. In pre-war days local authorities were borrowing money in the neighbourhood of 3½ per cent. To-day it is something over 5 per cent. With that short term loan system which has been so successful for many decades in this part of the world, we have found tramway finance is hampered and likely to be hampered for many years by the increasing rates of interest. When we consider the growth of our national debt we do not know what it is going to be, but we can see at the moment something between £5,000,000,000 and £7,000,000,000. That is going to absorb a great deal of interest, which can only be paid through national taxation sources. In addition, the sinking fund has to be provided, and all this means high rates, which will react on the municipal boroughs. Against that, there has undoubtedly been a great speeding up of industry. We have learnt that there is such a thing as standardisation, whereby we can get greater output in our factories which will help to pay some of the interest on the national debt. I should like to read to you a few observations on finance which I gave before a tribunal on finance.

"There are two factors which have made money rates increase, namely, (*a*) the demand of the Government for loans, and (*b*) the rise in income tax rates. The Government demands for loans no one can tell the extent of, consequently this uncertainty must, unless rates of interest are controlled, or securities are mobilised, increase rates of interest. Every £100,000,000 which the Government raises means less available supply after the war, and we get to the position that the last £500,000,000 may have to be raised in an entirely different form to that which we have been accustomed to, perhaps on the basis of a loan having a relation to the income tax assessment. It is obvious that the more we raise during the war the less we have for after the war, and that as a consequence, on account of the law of supply and demand, the rates of interest must be attractive, and that means higher prices. I regard the increase in income tax as having a very great influence on the investor in maintaining his demands for higher yielding investments. I am of opinion that demands for Government loan purposes must involve increased rates of interest unless, (1) interest rates are controlled, (2) home securities are mobilised, (3) a voluntary loan on income tax basis, with a penal income tax is made, (4) a forced loan is created.

"In any case, after the war demands for money would appear likely to be heavy as :—

"(1) Local authorities' works, even necessitous works such as sewage and water schemes, have been suspended for the period of the war.

"(2) Industries which are necessary for competing with German trades have not been fostered to the extent which circumstances demand.

"(3) If the war continues for two years it may be necessary to mobilise the nation for military and munition purposes, to the exclusion of purely non-war purpose productions.

"(4) The demand for shipbuilding and railway work will probably be great.

"(5) The sale of foreign securities will denude us of the interest thereon, and if we want foreign trade we must be prepared to lend.

"(6) The restoration will be needed of towns and cities and industries in allied countries we may be financing.

"The foregoing will only be a small number out of the total demands and will have an effect on interest rates. The sale of securities abroad will mean that we may have to ship more gold to create a balance than in normal times, or increase the bank rate to attract gold, and such increase will have an effect on rates for supply of money. Thus the outlook is one which at the moment can only be measured in the terms of upward rates. Judged broadly we shall probably have, after the war, (1) a huge debt with heavy interest charges to meet, (2) a huge income tax and other heavy taxation, (3) a reduced income from foreign investments, (4) heavy demands for money for municipal, national, and industrial purposes, (5) loans required to maintain foreign trade. The cumulative effect would seem to be higher rates of interest than those which prevail to-day and probably amounting to 7 per cent."

These ideas, I believe, will enable us to judge how far the handicap in the supply of money to municipalities is likely to be maintained. I believe we shall not be long before we find among the municipalities great difficulties in borrowing money at 6 per cent., and I believe the time is coming when municipalities must go to Parliament or go to the Chancellor of the Exchequer unitedly and say, "If we have to borrow in the open market against the Government, you cannot prevent us giving higher rates, and that is going to react on the National Exchequer, and it would be far better if the Government borrowed for the lot—(hear, hear)—and so reduce the charges on municipalities." As to sinking fund suspension, which was referred to by the president, I should be sorry to see any suspension of sinking funds. (Hear, hear.) When some years ago there was a proposal to suspend sinking funds, within ten days I got 500 letters from people who lent money to municipalities and big companies to ask what did it mean, and whether it meant that the local authorities were going to repudiate. The idea of suspension of sinking funds popularly is repudiation. We cannot repudiate, and we must not suspend, but what we have to say to Parliament is, "You must remove the restrictions on tramways, put up our fares, and enable us to pay the sinking fund." As to relieving of rates, I do not believe local authorities ought to put on to commercial undertakings the incubus of heavy burdens to relieve rates. The only thing local authorities have done is to lend their credit. The measure of their credit should be the difference between what a company has to pay and what a local authority has to pay for its money with the collateral security of the rates. Local authorities should not have more than 1 per cent. for the relief of rates, and the whole of the balance should be put into the undertaking for upkeep and maintenance. (Hear, hear.) In regard to the rise in wages, I believe wages have got almost to the breaking point, not because the men do not merit the wages, but because we have too much lavishness in our methods of conducting business and too much Parliamentary interference. What we have to tell the Government departments is that if wages are to increase at the rate they are increasing to-day, then municipalities must come to terms and have a proper readjustment of the position. Beaconsfield once said that increased means and increased leisure are the two civilisers of man. That is true to-day. What we have to do is to pay our men a living wage interpreted on a liberal basis. The men are entitled to nothing more. We must have a spirit of co-operation. We must breathe a new atmosphere of industrial co-operation. We must breathe conciliation between masters and men. The men are not to be treated as automatic machines ; they must be treated as part of the undertaking. They must be brought together, getting rid of antagonisms and grievances, and work for the common benefit of the district and nation. Just a word on the increased cost of materials. I believe that from a pre-war point of view materials are going to be a heavy price. Steel tires, rails and axles, there is very little doubt about it, will never return to pre-war prices. We cannot return to pre-war prices and conditions, because the increased wages in the production of these commodities are going to make a difference in the total cost. When one considers that the steel trade of this country has been during the war almost doubled, and that we are likely to take our place in the sun as the great steel producers, and the place which Germany occupied before the war, it will be seen that we must have a greater national output. It will, however, be at a greater cost, and we shall never be able to come down to the prices of pre-war days. Coming back to the wages which are included in the cost of material, I hope we shall, in considering what we have to pay, look on these matters from a broad and comprehensive point of view, and that everything we do in bringing the men and masters together will have a vitalising and vivifying effect. In regard to increase of fares, we all know that every person who walks along the road is a tramway manager. (Laughter.) If the car is two minutes late there is something gone wrong with the tramways. We want to sack that manager. If a parcel of eggs gets thrown off the tramcar and it does not retain its solidity we want to sack the chairman of the Tramways Committee. I have been sacked many hundreds of times. Everybody knows how to work the tramways, but nobody knows how to work them properly except the officers and perhaps one or two members of the Tramways Committee who take an intelligent interest in the work of the department. But we cannot always take an intelligent interest, because we are hide-bound by

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Parliamentary conditions and precedents, and, like Lord Milner, I would say, "Abolish the precedents and damn the consequences." I believe this question of increasing fares has to be dealt with. In our Town Council six months ago they declined to increase the fares, and said they would pay the loss out of the rates, but if the loss did come they would be the first to say that they would have a new chairman and manager. Very few of us have been allowed to increase the fares. I say that there should be no restrictions of any kind. If there is to be any veto, let us have a form of local option, and let the riders have the veto. Coming to the question of electrical power, I believe we have to take a broad and comprehensive view, and not a narrow, parochial one. The parochial boundaries of administration in electricity have to be removed in the national interest. What are we doing? We are wasting millions of tons of coal a year. We are burning coal in grates. We are burning it for steam raising. We are wasting all those products in the coal which have been of such vital importance to Germany. There is more value in the coal than in the steam raised. Why should we not erect electrical plants as near as possible to the pits, and where an adequate supply of water is available, and retain by a process of carbonisation the whole of the derivatives? Utilise the waste gas to fire the boilers, and the boilers will produce electricity, which can then be transmitted from the economical centres of production to the towns where the local authorities can distribute it. That is the national interest standpoint, and in these matters the parochial interest has to go to the wall, I believe there is a time coming when the whole of our gasworks practice will be entirely superseded, and then we shall generate gas by low temperature carbonisation, looking at the gas as the residual and the present residuals as the prime commodities. Then we shall be able to supply electric power at ·35d. or ·3d. We have the grandest national asset in coal which the world possesses. In Norway and Sweden they have water-power. We should take everything possible of value out of the coal, and use electricity as the prime mover of the country in production purposes. Do not forget when you contrast England with America that America employs 50 per cent. more machinery per man employed than we do. That means that they can get the output and pay the higher wages. What America can do Great Britain can do. The system of generating your power at your own place is a wasteful system, wasteful of coal and capital, because the capital is not employed long enough per day. But if the capital can be employed 18 hours per day, then we shall give Great Britain the national asset which is to-day being wasted to the tune of 60,000,000 tons of coal per year. With regard to Parliamentary procedure in dealing with local bills, it is of an archaic character; it abounds in technical elaboration and detail. What I suggest is that we shall have a local administration—that we should have a county board governing what should be done for tramways. We want some governing district body that can really appreciate the local needs. The needs of East Ham, West Ham, and Croydon may not be the needs of Sheffield, Halifax, or Leeds. We all have different needs, and it is the local people who can appreciate that best.

We know the barristers have great dialectical skill, but that does not get rid of the difficulties we have to contend with in regard to boundary questions. In regard to these boundary questions and tramways, what we have to do is to spread a spirit of national interest, not what is best for a particular town but what is best for the community. In regard to municipal weakness and strength, I think we want clarity of comprehension in our municipal work, we want singleness of purpose, and we want unanimity in national and co-operative effort. We are inclined to be a little too parochial and to have too much red tape. Let me read a few extracts from a report by Sir Francis Oppenheimer, late Commercial Attaché to His Majesty's Embassy at Berlin, on the question of tramway management. The municipalities admit that purely public enterprise has been found too thoroughly tied to move as rapidly as desirable, that modern circumstances of trade and industry may require that the best managers cannot be secured among municipal officials with only municipal pay, that Town Councils as controlling bodies show a lack of technical understanding, that the expected profits have failed because the rate of charges had to be lowered in deference to the demands of the people's representatives or because wages had to be unduly increased. The profits under public management were further curtailed by unavoidable concessions to the public of unprofitable lines, low tariffs, certain luxury in the rolling stock, etc. In the case of the supplies of electrical power more especially, greater freedom in negotiating contracts with important consumers has proved essential. Hard and fast tariffs are impracticable because large consumers, whom it is essential to secure, demand an individual treatment which necessitates discretion, and may be secrecy. The large staff of officials, chiefly in connection with a system of electrical tramways leads politically to delicate situations.

That seems to have hit off the troubles of Germany and applied them to Great Britain. What I suggest is that we should have greater commercial management in local authorities. Do not let it be thought I am casting any aspersion on municipal administration, but what we want is continuity of policy, and we shall never get that until there is a spirit of permanence. I would go further and say that in commercial undertakings of local authorities there should be some sort of devolution, whereby the powers of the council should be transmitted to the tramways or electricity or gas committee on a purely commercial basis. Taking a council of 60 members, 48 of them should not have the power, out of pure caprice, to upset the commercial management. If the powers were almost statutory on the part of the committee it would be a good thing for the undertakings.

On the question of new tramways, Leeds has adopted a system of goods traffic. I happen to be associated with the company which is carrying on the productive work. The tramways will carry 50,000 tons of material in a year's time. This is going to be a good thing. If it had not been for the Leeds Corporation offering to carry some of that material, the output of munitions would not have shown so great a volume as it shows to-day. In conclusion may I express the hope that we municipal people will always take a broad view of our administration. We owe it as a duty to those who are fighting for us. We have to take a broader view of things in order to get a harmonising influence in life, whereby we can all work together, not for the benefit of a section, but for the benefit of the nation at large. (Applause.)

Alderman BROADLEY (Halifax).—One cannot expect to follow the brilliant exposition of Alderman Spencer, but I hope that all tramway authorities will take the lesson he has sought to elaborate to heart. As having experience of tramway matters, backed by the ability of Mr. Spencer, one has gone into these questions more or less before the war. Since then the position has entirely changed. Rails which were bought in pre-war days at £6 a ton, one cannot expect to buy to-day at less than £10 a ton, and the price will probably remain at that figure for a few years after the war has closed. Labour for which we paid 10½d. to 11d. an hour now expects to be paid 1s. 6d. per hour. The labour which we got at 6½d. has jumped to something like 9d. an hour. We can expect prices to advance at least 60 per cent. What the interest on loans is to be is a matter for conjecture. One need not be surprised if two or three years from now, if municipalities are left to themselves, a rate of 6 per cent. may be required. It is all right for the big cities, whose concerns are profitable. In Glasgow, I believe, the tramway debt is non-existent. I wish we were all in the same fortunate position, but that is not so, and therefore it is open to the large tramway undertakings such as those of Bradford, Leeds, and Manchester to look after and help the weak. I hope the delegates will take into their consideration the wise things which Mr. Spencer has said.

Mr. A. ELLIS (engineer and manager, Cardiff Corporation Tramways.)—I have been highly interested in what Alderman Spencer has said. How the authors of the paper are going to reply I cannot imagine. Alderman Spencer has, of course, touched on subjects that are not in the paper. For instance, he has criticised to a certain extent something in the president's address regarding sinking funds. We should all like to do that, but we are not supposed to criticise the president's address, and I do not intend to do so. He has also touched on the supply of electrical energy, and he has incidentally referred to the Board of Trade Committee. I may take the opportunity of saying that many municipalities are looking on this Board of Trade Committee with a degree of suspicion. (Hear, hear.) We consider that as municipalities are more largely concerned with the supply and distribution of electrical energy and are interested from a national point of view, they ought to have more representatives on the committee. I am particularly interested because I am the chairman of the linking-up committee for the South Wales and Monmouthshire district. Like Cheshire and Lancashire, we are going to try whether, in course of time, the Board of Trade Committee will not be required, for we are able to discuss this matter and come to certain conclusions of our own. We agree, of course, that the production of electricity is controlled by certain facilities being available. You should have your generating stations near the coal and water. I suggest that the supply of water is equally, if not more important, than the supply of coal. In regard to the paper itself and the question of ordinary passenger fares, some may suggest that if the fares were cheapened there would be more riders. In our district we do not think so. We are of opinion that the working class people are so well off that they do not know how to spend the surplus money they have, and are quite prepared to pay increased fares, and that they have no desire for any reduction. In regard to workmen's fares, the restrictions laid down by Act of Parliament are most unfair and unreasonable. If the regulations for workmen's fares included the poorly paid clerk, one might see some reason in it. But to give the facilities to the workmen alone is giving a privilege to which they, as such, are not entitled. In regard to advertising, for many years we ran our cars without advertisements. Then there was a feeling that we should have a little more revenue, and we decided to have them. Personally I am against them. I do not believe in using tramcars as advertising hoardings. The value of advertising is decreasing to such an extent that we could do very well without the revenue now obtainable from that source. As to interest on investments, in our case all the surplus moneys have been invested. The interest accruing is put into the fund itself, as for example, the reserve fund, the depreciation fund, and other funds. The interest realised is added to the main moneys. As regards power expenses, this is a matter of great interest to undertakings

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throughout the country. We in South Wales are in a somewhat different position from most people. The tramway undertaking owns the power station. The Electricity Committee is the largest consumer, taking 75 per cent. of the total output. That will increase to, perhaps, 90 or 95 per cent. We treat our power station as a separate concern and treat the tramway and electricity undertakings as consumers. We charge these undertakings on the proper basis, according to demand, and allocate the costs to the power station. We fix coal at 12s. per ton. The price per unit is so much. For every 6d. of rise or fall above or below the 12s., we add to the price ·011d. I heard yesterday from a gentleman that they were paying 1·68d. per unit, plus 20 per cent. In a case like that they would be better with a separate power station. In regard to drivers, male or female, if they do not show improvements they are put back on the spare list. We do not give bonuses to the men. We consider that for the wages we pay we are entitled to get the best service. On the question of wages I quite agree with the authors that it would be desirable if we came to some arrangements, and I believe the executive of the Association have the matter under consideration. As to the Committee on Production, we look on it with a great amount of suspicion. We think it is a little bit worse than the usual type of arbitrator. An arbitrator, as a rule, splits the difference. The Committee on Production in the South Wales area has given ½d. per hour more than it has granted to the skilled fitters. It appears to us the employees have only to threaten the Committee of Protion and go before them, and the Committee say, "Yes, there you are." We desire to be fair to our employees. My committee feel that they are entitled to have a living wage, but they do not like the feeling that their hands are to be forced if these matters are sent to the Committee on Production. As regards accidents and insurance, we have always carried our own insurance, and we are in the position to-day that we have paid half the premiums that we should have paid if we had gone to a company. We have paid all our third party claims, the premiums under workmen's compensation, £600 or £700 for the costs of investigation and other charges, and in addition have saved £20,000. That is in 14 years. At the moment we have paid many items out of the insurance fund, and we have a surplus of £10,000. (Applause.)

Alderman R. T. FLETCHER (chairman, Wigan Tramways Committee).—I have no desire to enter into the technicalities of the question under discussion. To my mind it would be of some importance if the speakers were to give us some solution to the difficulties that are undoubtedly forecasted for us in the future. For instance, we are told that the price of commodities will go up. There has been no suggestion as yet as to any steps that ought to be taken in order to prevent the undue increase of prices. We have been told in an admirable speech by the opener of the discussion that we can look forward to paying increased interest on future loans, and if it is all true it may be anything in the region of 8 or 9 or 10 per cent. I agree that that would be a very big burden to the tramways, but why at a conference like this should not some conclusion be arrived at? In a company of wise men solutions ought to be found. I think if we had Lloyd George among us in a financial predicament a solution might be found. (Laughter.) It seems rather a joke to you (laughter), but we might take a leaf out of his book. For instance, why should we pay interest at all on borrowed money? (Renewed laughter.) I am going to make a suggestion that will some day be adopted, and you will not have your noses at the grindstone all the time paying moneylenders' interest. Since paper has been adopted as a means of exchange, and it costs only 2s. a thousand notes, why should there not be a demand made on the Government to stop this fleecing of municipalities in the shape of paying interest? Why not issue notes, "Wigan Corporation, 1917, to be repaid out of profits or from the rates." There is no need to dishonour or repudiate sinking funds and so forth. (Hear, hear.) There is no need to do that if you can only get at the source of your great troubles and stop the interest-mongering that is going on. The great fight of every community has been the enormous amount of interest that they have to pay. Since municipalities own tramways and other undertakings for the public good, there is no reason why the Government should not help all such authorities by making it no longer necessary to pay exorbitant sums in interest. Paper will pay as well as gold for local distribution. A one pound note I will accept at any time myself. (Laughter.) With respect to wages, the general impression is that the time has come when you have got to stop the working man from going for more wages. Do you not think it would be much better if you found some solution to the necessity for more wages, if, for example, the price of flour is reduced, the price of other commodities, increase. When the men come before you with the list of what they have got to find, you cannot turn your backs on them. In every rising market there will have to be ever-increasing wages paid, and it seems to me you would be serving your purpose far more valuably if you were to tackle the solution of the ever-increasing price problem.

A MEMBER.—It is not our business.

Alderman FLETCHER.—It is our business. We are here to pass resolutions and pull the strings and propagate principles.

Bailie M. W. MONTGOMERY (chairman, Glasgow Tramways Committee).—Perhaps as a young member of the Association you will excuse me if I offer a few observations. I quite agree with one of the previous speakers who says that if we are to obtain any direct benefit from this paper it will be necessary for us to confine ourselves as far as possible to the subject matter in it. Some of the subjects which have been mentioned are extremely interesting. Still I think it is only by keeping to the point and trying to get it unravelled that any real and lasting result will be got from this excellent paper. One question raised by the paper is how to meet increased costs. The suggestion in the paper seems to be that we should apply to Parliament for power either to abolish or to modify the limitations which Parliament has imposed. On that I do not agree at all with the conclusions arrived at by Alderman Spencer, who thinks that all the restrictions in regard to fares imposed by Parliament should be removed and that tramways should have an entirely free hand. I believe that in some undertakings it will be necessary to increase the fares, in order to meet the great advance in the price of materials and increase in running costs, but that local authorities or companies should be allowed to charge what they like is a proposal from which I strongly dissent. Another question is whether a reduction of fares would meet the situation. That in Glasgow is our experience. Our experience very clearly has been that as we reduced the fares we increased the traffic, and also our revenue. Some five years ago we had halfpenny stages, each of which measured rather more than half a mile. We doubled the halfpenny distance by giving two of these stages, and from that date to this the returns have gone up by leaps and bounds, the number of passengers has increased enormously and our earnings per car-mile have increased, and the net profit has also greatly increased. I am aware that these conditions might not apply to every tramway undertaking. Whatever conclusion we arrive at it will have to be viewed in the light of local conditions. It is at the same time interesting to know that since we cheapened our fares we have had this very remarkable result. At the present time we are earning something like 11·59d. per car-mile, and we have a revenue of £1,250,000. I do not state that in order to boast about Glasgow, but to show that, in some cases at least, by cheapening the article you can develop the traffic and increase the revenue.

Mr. R. J. BISHOP (vice-chairman, Walthamstow Tramways Committee).—I think it may be interesting to make one remark on that part of the paper relating to increase in revenue by revision of fares. We in Walthamstow spent a considerable time in considering the matter, and concluded by abolishing the ½d. fares, and an urban district council which has been referred to by one speaker as small fry set the example to the whole of the London area. The abolition of ½d. fares has been a great success and has turned a serious deficit into a surplus. In regard to the proper price that ought to be paid for electrical energy, I am afraid many of the figures quoted have touched more on the price for general supply and not on the charge for a tramway supply. In cases where tramways do not own their own power house the electricity department supplies the energy. We in Walthamstow spent many years on this subject and had some considerable controversies, but we evolved two years ago a formula which has worked very successfully and, I believe, very fairly between the departments.

The formula for fixing the cost of electrical energy to a tramway department is as follows:—

A.—Let A equal the cost of coal per unit sold.
B.—Forty per cent. of the said coal-cost for the extra cost of generation for traction purposes.
C.—Other works costs per unit sold. (That includes the whole of the works costs with the exception of distribution costs, which the tramways find themselves.)
D.—The cost of loan repayments and interest on capital expended (less distribution) per unit sold.
E.—·05d. for depreciation and contingencies.
F.—The number of units used for traction purposes.
G.—The annual cost of loan repayments and interest on the loan for traction plant.

X.—Total sum to be charged to light railway undertaking.

If you add A, B, C, D, and E together, and multiply by F and add G, you get the total sum to be paid by the tramways. I believe the cost at present works out at the same price as it was when coal was much cheaper than it is at present, and the electrical department are satisfied of its fairness.

Mr. W. MURRAY (manager, Walthamstow Council Tramways).—The paper which we are discussing is practical and to the point. Some seven years ago, in connection with power consumption, I had meters fixed on the cars. The average consumption then was 1·37 units per car-mile. For the next twelve months it was 1·18 units, meaning a saving of £1,200, while the total cost of the meters was only £140. If we had scrapped the meters at the end of twelve months we would have been in pocket, but we have a guarantee of twenty years on them. With regard to accident compensation, for a number of years we insured against third party risks, and insurance companies continued to increase the premium on these risks until the Council thought they should take the risk on their own shoulders. During the last five years we have carried our own risk, and in that period have saved nearly £7,000. There, again, I think the authors of this paper have been well advised to

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recommend that Corporations should consider the taking over of their own tramway accident risk.

Councillor D. D. IRVING (vice-chairman, Burnley Tramways Committee).—It seems to me one aspect of the case under consideration has almost entirely been lost sight of. Any person entering this room and listening to the discussion could not have imagined that this was an Association of municipal tramway people. What they certainly could have assumed with confidence was that we were an association of company-owned tramway concerns whose reason for existence was the purpose of making profit. Without in any bad sense attacking privately owned tramway systems, the sole reason for the existence of tramway companies is to exploit a public necessity or convenience solely for making profit for the shareholders. Quite obviously the reason, or what ought to be the reason, for the municipal tramway system is to meet the requirements of public utility at the lowest possible cost, and as far as possible to the exclusion of profit altogether. (Hear, hear, and cries of "No.") Some people say no, but it is not so very long since you had to pay for travelling along your roadways. It is not so long since you had to pay for travelling over bridges. We have progressed since those times, and those barriers to progress at present have almost disappeared. (A Voice: "No.") Well, practically so. The remaining ones could easily be retained in some third-rate museum as specimens of the bad old times that have gone. Those who live long enough will see the tramways perfectly free for those who desire to travel on them as the roads are to-day. Look at the vast amount of labour, a very expensive commodity to-day, that is involved in the printing, circulation, and collection of tickets, and the clerical work attached to the whole arrangements of fare charges. By an alteration in the system of fare charges over the whole country there could be an enormous saving.

There is another point of view which a municipality ought to take into consideration, and which no private company could be expected to entertain at all. Surely we have arrived at a stage in our existence when we know that a cheap tramway system—and the cheaper the better from this point of view—is conducive to the scattering of the population, the elimination of congested areas, and the possible improvement of that national disgrace—housing for the great mass of the people. Your tramway system should be an exceedingly valuable aid in building up the public health and public happiness. I have not intervened in this debate to urge any revolution in connection with tramway work, but whatever tramway managers may think, they have approached the subject from the point of view perhaps of those who were brought up in the bad old school of company management, and cannot get out of the training. The municipal tramway manager, even if he has not had that bad schooling, is surrounded by people who have no other object in life but profit-making, and so that environment reflects on the manager. But I would hope that members of municipal corporations who are not so bound up with that point of view would realise as the important factor that public utility and helpfulness are superior to the question of profit.. There are many ways in which a municipal tramway undertaking can be made to contribute to public well-being, other than earning profit for the relief of rates. For instance, it can be used for the breaking up of our congested areas of population in connection with housing schemes, and become instrumental in a large degree to increase the measure of public health and happiness. A return of the kind, impossible to estimate in the term of "fares," is nevertheless an extremely profitable "return" in the best sense of the term.

Councillor Fryer (Birmingham).—There are just two points I would like to make in connection with this paper, and the first is the danger under which the authors seem to be of regarding a tramway undertaking as a separate business undertaking. I think it is impossible that a municipal tramway undertaking can ever be regarded as other than part of the municipal administration of the town. When the authors recommended that all concessions and privileges with regard to fares shall be done away with, I think those of us who are municipal administrators have a right to consider whether that would be in the general interest and well-being of the town as a whole. In the large provincial cities the old housing conditions were bad. We in Birmingham have at present from 40,000 to 50,000 back-to-back houses. In such a case we say it is distinctly in the interest of all concerned that the population shall be spread out and that a very real part of the profit of the tramway undertaking is reflected when you improve the surroundings of the working people. There I should join issue with one of the statements put forward by Alderman Spencer this morning, that the committees of local authorities should have very much larger powers, independent of the authority of the Council, because that way lies the danger of government by water-tight compartments. I agree with what the representative of Burnley said a few minutes ago, that we have to remember that the health and well-being of the people are among the chief considerations. I think it is worth while remembering that a term is often used, which is quite mistaken, namely, the term "trading undertakings." It is all very well to speak of a trading undertaking when it is brought into being and run for the benefit of a company, but when it is part of the municipal machinery of the town it is of the nature of a great public service, and what it contributes in the service is its justification. I am with the authors of the paper in believing that the affairs of these undertakings should be so conducted that they are on a sound and stable basis. I would regard it as deplorable that a tramway undertaking should be a charge on the rates, and I think when there is a clear case in virtue of extraordinary circumstances for altering your fares you should alter them boldly on a business-like basis. I do not believe that any well-guided Council would oppose its tramway committee in a judicious increase of fares if it was shown that the finance depended on some increase.

The two points I wish to make are these—that we should not regard a tramway undertaking as being a separate undertaking, but part of the great municipal service, and second that we should consider that it is abundantly worth while to divert some of its profit in securing the welfare of the people. In the first place, the undertaking should be maintained on a sound stable financial basis. In the second place, its management and those operating it should be reasonably and properly remunerated and enjoy decent human conditions of service. Having secured these two considerations, the profits of the undertaking ought to be largely reflected in added benefits to the user. If this conference is of opinion that that is a sound philosophy to underlie such an undertaking, it seems to me that it will agree to the policy expressing that philosophy involving some differentiation in fares—workmen's fares and children's fares—seeing that we desire to spread out our population. The whole principle of town planning and new housing depends on our spreading out our population over a wider area. People are housed in the north of England and in some of the larger Midland cities in such a way as to cast a reflection on our common civilisation, to say nothing about our common Christianity. In some of our towns people are living 100, and as much as 150 and 200 to the acre. Where I come from there is one of the finest examples of town-planning, that is Bournville—perhaps the most beautiful estate in the world. If the whole of the workers in this country were housed as they are at Bournville, about nine families to the acre, it would only require one-sixty-sixth of the land of the kingdom to enable the population to be so housed. So I believe in harnessing the activity of the tramway undertaking to the greater work of housing, even though it seems to me that we are carrying people at a loss expressed in money, for we are securing greater benefits of municipal administration and are helping the people generally to a higher standard of life. (Applause.)

The PRESIDENT.—Before closing this discussion we should very much like to hear our friend, Mr. Goodman, from Australia. He will likely have something very useful to say. (Applause.)

Mr. W. G. T. GOODMAN (chief engineer and general manager, Adelaide Municipal Tramways Trust).—I feel very much honoured in being called on to take part in this discussion, and also in being invited to be here to-day with you. One or two little details in connection with this paper have indicated to me that you might like to hear what our conditions are, and what we do in South Australia. In the main I agree with the contentions of the authors of the paper.

With respect to workmen's fares we, as you know, are subject to a great deal of labour legislation in Australia, and in some cases provision has been made that low rates have to be charged for the so-called workmen's cars. We in South Australia have not adopted any such principle, because we do not consider that because a man goes to work at a slightly earlier hour than other workers he should have a concession. We find that the artisans are well paid, and in some instances better paid, than the clerks and shop assistants, and we do not see why the man who is better paid should, simply because he goes to work an hour earlier, travel at a cheaper rate. It is only taxing those who go at the later hour to pay for the workman who goes at the earlier hour. Personally I think it is wrong in principle, and there is no justification for imposing this burden on the tramway authorities.

The second point is the question of children's fares. The authors recommend that the general principle should be to allow children under three years of age, not occupying a seat, to travel free. With that I agree, and it is the principle we adopt out there. We make a rule to carry children for a penny over any three consecutive sections. That is, if a child goes over six consecutive penny sections he pays a twopenny fare, and if over nine sections, a threepenny fare. That is for a child between three years and twelve. Our idea in making that concession is that if we allow the children to travel at a low rate of fare, it induces the mothers to travel with them, and we bring about an increased traffic during the flat hours of the day, and this is especially noticeable in the summer.

The third point is the question of power consumption. I note that the authors recommend that meters should be adopted for the cars. This is a matter to which I have given a great deal of consideration, but our difficulties in Australia in operating are somewhat greater than you gentlemen have to contend with here. On many of our cars we have to change the crews no less than seven times during the day. Men have to be relieved for meals, and the spread of eighteen or nineteen hours is more than the two shifts of eight hours; consequently, we have an intermediate shift, so that the crews are changed no less than seven times. I think it would be impossible in such circumstances to have any satisfaction by adopting meters on the cars. We do find that a great service is

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rendered by having proper motor inspectors, whose duty it is solely to watch the driving and controlling of the motormen. One point raised by the authors is that the elder man as a rule makes the more efficient motorman. In some cases this is so, but in the majority of cases we do not find that that is our experience. We find that the men get careless. Familiarity breeds contempt, and they cut up into parallel before they should be off the last series notch. In most cases we have to deal more with the older men as to the extravagant use of power than with the younger man in the service.

The fourth and most important point I have to mention is the suggestion that there should be a properly constituted authority appointed to settle matters in dispute between employers and employees. No doubt many of you know that we have such an authority in Australia—not only one but a great many authorities—and the system works fairly well. It relieves the tramway authorities of a great deal of responsibility, but if you have such an authority to fix the rates of pay, there should be some other authority to fix the rates of fares, in order to meet the extra demands for wages. (Hear, hear.) We find as we go on year after year that our operating expenses increase. Why? Simply because every time there is a dispute between employers and employed they go before the proper tribunal, which awards an increase of wages, and we are not allowed to increase our fares, or we are not supposed to. Fortunately my board have decided, owing to the increased cost of wages, which has been very material within the last few months, and the increased cost of materials due to war conditions, to raise all fares a halfpenny. The penny fare is 1½d. now, and a halfpenny is added to all other fares.

The fifth point is accident insurance. The authors said that it is more satisfactory for their undertakings to carry their own risks. With that I absolutely agree. We found that up to the present, if we had insured against third party risks, after meeting all disbursements and premiums which we were asked to pay, the insurance companies would have had a profit of £30,000. We carry our own risk, and we pay about 1 per cent. of our revenue to meet all charges—that is legal expenses and compensation—and we now have a fund of over £10,000. As you know, we have been in operation for only a few years—about eight. The whole system has been in operation on an average for about four years. I thank you very much for allowing me to take part in the discussion, and I wish to express my appreciation of being allowed to be present, and my congratulations to the authors of the paper. (Applause.)

The PRESIDENT.—Before I bring the discussion to a close and invite the writers of the paper to reply, I would express my personal obligation to those gentlemen for the splendid manner in which thay have prepared it. I am quite aware that the title of the paper and its subject are not on the lines which were first suggested, but it really has met a great deal of what I had in my mind, and what was in the mind of the Executive Council, when the authors were invited to spend their time on it. The criticisms which have been made have not gone to the root of the problems that are really named in the paper, so as to give us a practical result in dealing with these questions. The question of raising the ordinary fare has not been adequately dealt with by the critics. We know that a great many of the undertakings have a reserve fund for putting their business on a sound financial footing, if they can persuade their Councils to take advantage of the Parliamentary powers they already possess.

With regard to workmen's fares, I am rather surprised no one has pointed out that the workmen's traffic ought to be—and I believe is in most undertakings that have realised it—a most profitable traffic, because workmen travel in large numbers in one car. You always have a full load, and therefore it is always a very profitable load, so that the idea that workmen's traffic is unprofitable is entirely wrong. That pre-supposes that you have a sound basis of fares for the workpeople. It is a profitable thing to encourage the workman to travel about. If he travels to his work on the car he will travel for his pleasure on the car, and you are creating a traffic which will never leave you.

Then the difficulties of differentiation might be more properly brought up on Mr. Murray's paper. We know from our own experience at home about differentiation between ordinary passengers and clerks, shopkeepers, shop assistants, and even cloggers. The latter classes all travel daily at labourers' rate, and they *are* differentiated from the ordinary passengers. Further, there is the practice of allowing everyone to travel at workmen's fares up till eight o'clock in the morning, because I suppose the difficulty of distinguishing ordinary passengers from the workpeople has not been got over. In our district the artisan, mechanic, and daily labourer can travel up till nine o'clock at workmen's fares. The ordinary passenger, even if he turns out at 5.30 in the morning must pay the ordinary fare, and we have no difficulty in carrying out that practice. (A Voice: "That is wrong.") It may be wrong.

The writers of the paper rather deprecated parcels traffic, though that is very profitable traffic if properly managed. We have carried parcels ever since the institution of the tramways, and our net profit is 75 per cent. on the total income. The parcel work should be incurred not only for the profit, but because it is a great convenience to the people to have the use of the cars for the parcels. With regard to working expenses, I do not propose to go any further because of want of time; moreover there are so many heads in this paper which might make separate papers in themselves. I will conclude by expressing my high appreciation of the paper, and ask the writers now kindly to reply. (Applause.)

Mr. G. W. HOLFORD (general manager, Salford).—Mr. Barnard and Mr. Priestly have asked me to reply. We desire to express our pleasure and satisfaction at the friendly manner in which the paper has been received and with the interesting discussion which has taken place. Our main object was to raise a discussion, and I think we have raised a very interesting one. One of the privileges we have enjoyed was to listen to the excellent address by Alderman Spencer. When we were asked to write the paper we were set certain limits and we were not supposed to travel so widely as Mr. Spencer, who dealt with national finance with some slight reference to municipal finance. With all respect to Mr. Spencer, perhaps his address would have been more fruitful if given before the Municipal Treasurers' Institute or the Municipal Association, because we tramway people have very little control over the investment side of the undertakings. Usually Corporation loans are dealt with by some other committee of the Corporation. We all know Mr. Spencer is a high authority on finance, and I am hoping after hearing him this morning that the Government will not look very far afield and will rope him in as an adviser on the financial side, and I am sure he will give excellent service. (Hear, hear.) Mr. Spencer did refer to two or three items which we have mentioned in our paper. Generally he did not contest the views we submitted in regard to increase in wages, cost of materials, etc. Mr. Ellis referred to the Electrical Committee, and I may say the Executive Council are endeavouring now to obtain an increase in the representation of municipal authorities on that committee. Mr. Ellis hardly understood the reference we made to investment or to the interest which accumulates on various funds of a tramway undertaking. In some towns interest accrued on various funds is put to the borough fund, and where there is a renewal fund the interest is not put to that fund, but probably to the tramway fund itself. We are of opinion that each fund should benefit from the interest which accrues to it. (Hear, hear.) Alderman Fletcher, of Wigan, submitted some rather novel suggestions for dealing with money. I am afraid our time is too limited to follow him closely. It appears an excellent idea to be able to do anything with a piece of paper stamped with the name of the Borough of Wigan on the top, and we shall be pleased to have full details as to how to work that out. (Laughter.) Alderman Fletcher also referred to the cost of food and said no speakers had referred to the root evil, the increased cost of living. I think that is rather outside tramway departments. It is a national question and it has been deputed to eminent gentlemen—Lord Rhondda and others. It is too much of a national matter to be dealt with in a tramway conference. I was pleased to hear Bailie Montgomery, of Glasgow. We always hear of the wonderful results obtained in Glasgow which make us, I am afraid, rather envious at times. Although they say that in Glasgow they get better results if they reduce their fares, that does not follow in other towns. Even in London itself they have had to withdraw some of the cheap fares. Mr. Bishop, of Walthamstow, told us of the length of time they had spent in revising their fares there. It is generally a topic which causes a good deal of discussion in committee, but I do not think the time was wasted, especially when we hear of the excellent results from abolishing the halfpenny fares, and now practically the whole of the London area has done likewise. I am pleased to hear that. I was also glad to hear from Mr. Murray the excellent results of the insurance system and also that he supports our views with regard to car meters. I was rather sorry to hear some of Councillor Irving's remarks. I think he rather misunderstood some of the speakers if he thought that we are all out for profit making. I do not think we have that idea. The writers of the paper certainly have not, but we do think we are justified in avoiding losses (hear, hear), and after we have avoided losses we are justified in creating and preserving reserve and renewal funds. After that I am not particular whether the profit goes to the rates, or to cheaper fares. I hope you will be a long liver, Mr. Irving, but however long you live, I hope you will not see free travelling. At any rate, I should not like to manage a tramway with free travelling. (Laughter.) We have to look first for other essentials of life, such as free water and free food. We are highly honoured to have heard Mr. Goodman, and I wish to express my thanks to him for addressing us. It is quite interesting to hear the practice from "down under" and particularly to hear that in many ways they are in line with us. They are in advance of us in having a constituted authority for labour troubles, but I think that after the war we shall have such authorities throughout the country. I think the Whitley report will lead to that, and probably we shall reduce a good part of the trouble between employers and employed. We are very pleased to hear that the recommendation that we make in regard to insurance is followed in Australia with good results. Councillor Fryer, of Birmingham, suggests that we plead for a separate business undertaking. What we ask is that the tramways should be treated as a commercial enterprise, and I adhere to that. I do not think that it should be exploited by other departments or by the ratepayers when there is no justification for giving money to the rates at the expense of tramway departments. I thank you for the very kind hearing you have given. (Applause.)

A vote of thanks was awarded to the three authors of the paper.

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Bailie M. W. MONTGOMERY (chairman, Glasgow Tramways Committee).—I am very sorry that Mr. Dalrymple, our general manager, is unable to be present with us to-day to introduce the discussion on the rule of the footpath. He had at the last moment very reluctantly to abandon his intention of being with us. The King is visiting Glasgow this week, and Mr. Dalrymple's presence is considered necessary there in order that traffic and other matters should be attended to. He has asked me to read the following notes to you on a subject which I hope will prove of interest to the conference :—

THE RULE OF THE FOOTPATH.

BY JAMES DALRYMPLE
General Manager, Glasgow Corporation Tramways.

I have been asked by the Executive Council to open a discussion on the question of whether it is now desirable that pedestrians on the footpath should be requested to keep to the left instead of to the right. These notes are not in any way exhaustive. They are intended simply as an introduction to the discussion of a subject which I think is worthy of our attention at this time.

I have not gone fully into the history of the rule of the road or the rule of the footpath, and I am not prepared to say definitely why in this country it was originally decided that in driving we should keep to the left, and in walking we should keep to the right. We all know that on the Continent the rule of the road, that is the carriageway, is that we keep to the right. This rule, however, is not universal, even on the Continent.

In regard to the rule of the footpath, I am not sure how it is that throughout this country, since ever there was a recommendation on the subject, we have kept to the right, although on the carriageway we have always kept to the left. I have heard various explanations, one being that pedestrians in the olden time always met each other left arm to left arm, in order that the sword arm would be free. That may have been the origin of "Keep to the Right," and it may not. It is a fact, however, I suppose that for centuries we have kept to the right. It will be necessary, therefore, before we can hope to get a change introduced and made general throughout the country that we should be able to make out a good case.

In the first place it must be clearly understood that we, as a tramway authority, are only dealing with roads and streets on which tramways are laid and where footpaths are provided for pedestrians. That is to say, it is our business to look at the question from the tramway point of view. We are not dealing with country roads where there are no footpaths. In the case of country roads it might be argued that the proper place for pedestrians is on the right-hand side of the road. In fact, the recommendation to keep to the right may first have been made to meet the conditions on country roads. If this were so, I would submit that the conditions now prevailing on out city streets call for a reconsideration of the whole question.

The London "Safety First" Council which was, I think, brought into being by our old colleague, Mr. Blain, and for which he acts as Secretary, have had this question before them for some time, and they are extremely anxious to get the local authorities to recommend pedestrians to keep to the left instead of to the right.

I understand that quite a number of local authorities, not only in the London area, but also throughout the country, are in favour of the change. I have communicated with all the local authorities operating tramways in regard to this matter, and the following is a tabulation of the replies :—

Number of letters sent	87
Number of replies received	84
Question not considered	39
Question considered, but no decision arrived at	15
Question considered and change approved	15
Question considered and sent on to Watch Committee	11
Change made	1
Objection to change	3

So far as the carriageway is concerned, the number, variety, and speed of the vehicles using the streets is becoming more and more a source of danger, not only to the vehicular traffic itself, but also to pedestrians, and perhaps at no time have we had so many street accidents as we are having from day to day at the present time. We consider that vehicular traffic on our streets requires more strict regulation than has hitherto been given to it.

In the case of the footpaths also, the conditions are gradually becoming more inconvenient and more dangerous for pedestrians. When two pedestrians meet on the footpath it is well that each should know the proper side to take. It is somewhat awkward when there is any dubiety in regard to the matter. This, however, is not simply the case of one pedestrian passing another. We have to consider footpaths crowded with pedestrians where those who are on the right, or next the carriageway, are forced to walk along the kerb and, very frequently, require to leave the footpath altogether.

It may be asked what interest is all this to those who are using the carriageway ; it may be by horse-drawn vehicle, cycle, automobile, or tramcar. This question is, I think, of very great interest to those who are driving on our streets. Indeed it is being raised by those who are using the carriageway, and it is being raised purely on the ground of safety, not only the safety of the user of the carriageway but also and, perhaps, more particularly the safety of the pedestrians on the footpath.

We all know that the present practice of keeping to the right means that those pedestrians who are nearest the kerb must always be proceeding in the same direction as the traffic on the carriageway. That is to say, they have always their back to the traffic. If the present practice were altered, and pedestrians were asked to keep to the left, those who were proceeding along that part of the pavement nearest the kerb would always be facing the traffic on the carriageway.

I have no doubt that many of those present to-day must often, in passing along the street in an automobile or tramcar, more especially where the carriageway is narrow, have watched the pedestrians on the footpath and have wondered which one was going to step suddenly in front of the vehicle and possibly be injured ; and let your driver be ever so careful, it is sometimes impossible to avoid an accident. Pedestrians, generally speaking, are very thoughtless and absent-minded. Indeed, it is remarkable how few people, when about to cross a street, take the slightest trouble to look round.

In suggesting that pedestrians on the footpath should keep to the left, it is with the object of minimising danger. The result of the change would be that those pedestrians who are travelling with the street traffic would be next the buildings, and, should any of these pedestrians wish to cross the street they would first of all require to cross the pavement. They would thus have time to see if any vehicle were approaching, and the driver of any vehicle would also have an opportunity of anticipating trouble.

No doubt a number of objections will be urged against the proposed change.

(1) It will be contended that it will be impossible to get the change introduced into every town, and it will be very inconvenient to follow one practice in one town and the opposite in another. I do not think there is much in this objection. If a number of the larger cities and towns were to make the change the others would undoubtedly follow.

(2) Another objection will be that it will be very difficult to induce people to change the present habit of keeping to the right which has been observed for many generations. I am not sure that there is much in this objection either. On the contrary, I think the citizens would welcome a change at this time. The rule of keeping to the right has only been a recommendation. There is no compulsion in the matter. We have tried for many years, by means of notices fixed to the lamp posts, and in other ways, to educate people to keep to the right, but I cannot say that the efforts of the local authorities in this matter have been very successful. If a distinct break with the past were made, and people were now asked to keep to the left I think we would immediately see a very decided improvement.

(3) There is also the objection that it would be inconvenient to have a practice on the streets of a town which might not be followed on country roads where there were no footpaths. You will find, as a general rule, that pedestrians on country roads take the centre, or that part of the road which happens to be cleanest. The number of accidents to pedestrians on country roads caused by their going to the left instead of to the right must be practically nil. In considering a question like this we must take into account the numbers to be affected. In the country we have the single pedestrian or perhaps a couple. On the city street we have the multitude.

I trust that the tramway committees throughout the country will take up this matter. The position only requires to be brought clearly before the Watch Committees, who are as anxious to look after the welfare of the users of the streets as we are. We are making great changes in many walks of life in these days, and I think that this is a change that could be made with advantage to us all.

The PRESIDENT.—I think you will agree with me that Mr. Dalrymple has put the case for the change proposed in a very simple, straightforward way. To make it useful I think we should conclude the discussion of this paper by a resolution in favour of a change as suggested by Mr. Dalrymple, that resolution to be forwarded to the Home Office and to the municipal authorities of this country.

Councillor T. CANBY (vice-chairman, Huddersfield Tramways Committee).—When the resolution in regard to the rule of the footpath was sent to the Tramways Committee in Huddersfield, we discussed the matter pretty fully, and the committee felt that something ought to be done. The main feeling of the members there was that it was more a national than a local thing. If it could be adopted generally no doubt it would be a great benefit to the country, because I am sure everyone here will realise that the present system is wrong. The present system suggests that we should be put into blinkers like horses, so that we should not see the traffic coming. I believe the best thing would be—and I believe it has been discussed for many years—to have the rule of the road altered

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and get on to the continental system. (Cries of "No," and "That is another question.") Take the West Riding of Yorkshire, where the towns are very close together. Suppose some of these towns adopted the new proposal, and others did not. The populations are so much intermixed that there would be a certain amount of confusion. I take it that if you could get all the people to walk on the proper side it would be a great advantage, but I think the best thing would be to get the rule of the road altered. If, however, that cannot be done, I am strongly in favour of the resolution you are suggesting, and I shall vote for it in the hope that something will be done. It is a good suggestion, and if carried out would be of great benefit to the community. When you are walking along the road and vehicles pass quickly and silently, and when you step off the footpath, there is great danger of being knocked down. I shall support the resolution provided an alteration in the rule of the road cannot be got.

Mr. H. E. BLAIN (operating manager, London General Omnibus Company and Underground Railways).—If I may say so, I think this is a matter which is of more importance to traction people than at first sight they would imagine. Mr. Dalrymple has mentioned the fact that it is the London "Safety First" Council which has been mainly responsible for bringing this subject before the public view. Many of you are probably not aware that in the metropolitan area there are over 46,000 street accidents in a year, of which over 800 are fatal. That being so, necessarily the question of accidents there is an exceedingly serious matter, and in connection with the company which I represent I found when I joined them four years ago that the accident record and the amount of money paid in claims were almost phenomenal. I dare not mention the amount for two reasons: one is that you probably would not believe it, and the other is that I do not want to tell you. (Laughter.) I felt that it was absolutely necessary that we should reduce both the number of accidents and the amount of claims; and when I say that in four years we have reduced our claims' costs by £50,000 per year, you will agree that there was room for improvement. (Hear, hear.) On analysing the nature of accidents, one thing became very prominent indeed, and that was the very great proportion of accidents which happened to people stepping from the near-side pavement as against those stepping from the off-side. I, therefore, had a considerable number of these accidents analysed, and found beyond a shadow of doubt, that if the rule of the footpath had been reversed in all probability three-quarters of these fatal accidents would have been avoided. While this paper was being read, Mr. Furness told me that almost 40 per cent. of the accidents in Blackpool occurred to people who were walking on the right-hand side of the footpath on the island pavements on the promenade. They stepped off the pavement and were hit at once by vehicles.

There seems to be similar experience in other towns, and it is a matter which should be modified. We are the most conservative nation on the face of the globe, and because we have got accustomed to walk on the right-hand side of the footpath, that is put forward solemnly by some local authorities as a reason why we should not vary the practice. I do not believe that this attitude confronted by hard facts can continue. The hard facts are there; it is for us to convince the local authorities that the change is not only desirable but absolutely necessary. I was exceedingly interested in Mr. Dalrymple's figures in regard to inquiries from local authorities. We circularised the local authorities in the London area and 38 of them are in favour of the change and eight are against it, only one of whom advanced a reason; the others appear to have neither reason nor anything else. (Laughter.)

I hope that this conference will pass the resolution which you have indicated. We saw the Chief Commissioner of Metropolitan Police, Sir Edward Henry, and found out his view. He says that, if the public demand for this change is justified by facts, he would be very glad to fall into line. I believe that, if this matter were discussed in the localities, there would be no doubt as to the result. All of us might with advantage take a greater interest in this "Safety" movement. Putting it on the very lowest basis, you will find that your accident costs are enormously reduced, and what is of infinitely greater importance, you will find that the risk to the public has also been reduced. The London "Safety First" Council has not been in working operation for more than nine months, but we are more than satisfied with the results so far as London is concerned. Notwithstanding our darkened streets, the accidents all over the metropolis have been reduced very materially, and I believe this improvement is very largely due to this campaign. We have got almost all the traction undertakings—including the railways—and the owners of street vehicles and most of the carrying companies connected with it. I should very much like to see the campaign taken up by the tramway undertakings all over the country.

Alderman Sir J. COURTIS (chairman, Cardiff Tramways Committee).—Cardiff is one of the authorities which have approved of Mr. Dalrymple's suggestion, and I think we are indebted to him for bringing the matter so prominently before the Association and the local authorities. What has struck me as surprising is that out of the number of local authorities to whom Mr. Dalrymple wrote 39 have not seen fit to make any reply. I think that shows a lack of courtesy on the part of these authorities. I am interested in what Mr. Blain has said, because he is an authority whose opinions we all respect. We have in Cardiff a street where numerous accidents have taken place for the very reason mentioned, namely, people stepping off the narrow footpath at a place where there is a narrow roadway. We hope after the war to widen the thoroughfare. At present we are meeting with the difficulty of accidents occurring constantly. People step off the footpath without thought; you cannot blame them; one is often absent-minded in walking along. I hope the Home Office will be approached; I think that is the authority which should be tackled on the subject. A deputation should wait on the Home Office and point out the desirability of making this change, because I think the Home Office should issue a much stronger instruction to the head constables to see that the rule of the road is observed more than it is. Many of us find horse vehicles in particular on the wrong side of the road. We have had instances innumerable. Many of the horse vehicles and some of the motor vehicles are closed in so that the drivers do not see anything that is going on behind them, and they do not take the trouble to find out what is behind. They keep to the middle of the road, and when a motor vehicle overtakes them the driver thinks he is safe in taking the wrong side. The other driver, hearing an approach, pulls over, and an accident results. If the local authorities would do more in attending to this, and do less in summoning motor drivers for having too much light or for having a dull light, and if they would see to the people keeping to the proper side of the road, many accidents would be prevented. I have much pleasure in moving that a deputation from this Association wait on the Home Office and make a strong case, and I hope Mr. Blain and others will take part in the deputation. I think also that we should circularise the local authorities at the same time.

Mr. A. H. SCOTT (Highways Committee, London County Council).—I rise with some diffidence about supporting the resolution. It is not that I am not heartily in sympathy with it, but I believe that if we went as a deputation from this body to the Home Office we should not meet with the result we hope for. I think the resolution ought to be sent to the Municipal Association. The matter ought to be dealt with by our different municipal tramway committees, and they ought to present it to their Councils, and to get from the Councils an expression of opinion. That united opinion expressed, not through an individual Tramway Association, but through the Municipal Corporations, will achieve, I am sure, a result much better than representations from this Association, important as it is. I want to see this change put into operation, and I am only throwing out the suggestion because I do not think the present proposal is the best way to achieve the aims we all have in view.

Alderman T. P. GRIFFITHS (chairman, Southport Tramways Committee).—I think this is a matter in which we shall progress most rapidly in approaching it slowly. We have to deal with very old customs. The state of traffic on the streets arises from the plain fact that the public will not observe what are supposed to be the rules of traffic. Neither in walking nor in driving are the rules observed. Then when we get to the magistrates they find they are not supported fully by the law. One gentleman has suggested that the best body to act is the Municipal Corporations' Association, and I believe that you will proceed more rapidly by going to the Municipal Corporations' Association than you will by simply sending a deputation to the Home Office from a section such as the tramway interests are. We are liable to be met by prejudice. Unquestionably this would be a very great improvement, but we have to deal with old-established customs.

Mr. W. MURRAY (manager, Walthamstow).—I think we are getting into a difficulty. I think we should refer the matter to our Executive Committee to pass a resolution, send it to the Home Office, and pass it on to every municipal member of this Association. That would meet what is wanted.

Alderman SPENCER (chairman, Halifax Tramways Committee).—I support the suggestion of a deputation to the Home Office. If you go to the Home Office now probably nothing will be done for six months. They do not move very swiftly. If you adopt the suggestion we could do a good deal by educating the local authorities in the intervening six months. I am one of those who have not thoroughly appreciated the importance of this subject. I have heard more to-day from Mr. Blain of a convincing character than I have heard for a long time. What we all need to-day is for the municipal tramway authorities to get accurate statistics during the next few months, and then we can try to educate the whole of the municipalities and get them to move through the Municipal Association with the Tramways Association behind them. If we try to move the Municipal Corporations' Association on the subject, we are going to have a pretty tidy job. It is not easy to do it. I have found in dealing with that body, that unless it is something which touches the law you do not move them very quickly. This is a general public question and we need to educate. Let us do so until we do stir up the Home Office.

Councillor R. J. BISHOP (vice-chairman, Walthamstow Tramways Committee).—We know that there is a law for vehicle traffic on our roads, but I have yet to learn that there is any law that a pedestrian has to keep to the right. We know that notices are put up—"Keep to the right"—but I do not think there is any compulsion that a pedestrian should do so. Therefore, why should we go to the Home

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Office and get this altered? It is a question for the municipalities themselves. London is slightly different. In the metropolitan area we are under the Home Office. I do not think in Bradford you have to go to the Home Office to get permission to put up notices—"Keep to the right." It is a matter for the towns themselves. We know it has been the rule for centuries to keep to the right, a sort of unwritten law, but I am afraid pedestrians do not follow it. I think one object lesson is the bridge at New Street, Birmingham. It is always full of pedestrian traffic, there is a "Keep to the right" notice, but if the authorities want to get the pedestrians to keep to the right they have to have a policeman at each end to make them do so. The matter is in the municipalities' own hands. That the change is desirable, one may almost say necessary, is undoubtedly the fact, but I think if we adopt the first suggestion of passing a resolution we should communicate, not particularly with the Municipal Association, but with each municipality in the United Kingdom. In that way we should do better than we should do either by having a deputation or anything else to go to the Home Office. The whole thing is summed up in Alderman Spencer's phrase—"Educate your people to keep to the left"—and I do not think you will have any need to have a law made for the purpose.

Councillor E. HEAP (chairman, Burnley Tramways Committee).—I have great pleasure in seconding the resolution. After the discussion and after hearing the statistics given by Mr. Blain, I quite realise the responsibility. I had realised it in Burnley, but more since I came to Blackpool. I was absent-minded last night walking along the Blackpool streets and was very nearly trapped by a tramcar; it was entirely my own fault, but if I had been going the other way I should have seen the car.

The PRESIDENT.—The Secretary will carefully draft the resolution, but it is simply a resolution on the lines of Mr. Dalrymple's paper, with instructions that it shall be forwarded to the Home Office and the municipal authorities.

The resolution was carried unanimously and a vote of thanks was accorded to Mr. Dalrymple.

DIFFERENTIATION IN FARES FOR WORKMEN AND OTHER PASSENGERS ON TRAMWAYS.

BY MR. WM. MURRAY, ASSOC. I.E.E.

(*Tramways Manager, Walthamstow Urban District Council*).

The subject on which I have been asked to submit a few notes at this our Annual Conference is not one, I fear, likely to excite breathless interest on the part of any of the delegates present. Whatever attention it may receive will probably be that of calm and judicial consideration, rather than of either enthusiastic advocacy or dogmatic condemnation. The evil to be dealt with may seem at first glance to be of comparatively little importance; but the principles involved are of grave moment, and the results in some cases very far-reaching. Personally I think it is one which is worthy of serious consideration. With many of us the problems of how to increase revenue, and how to check the growth of expenditure, are likely to become more and more acute as time goes by; and the question of "Differentiation in Fares," as I shall attempt to show, very materially affects the first of these propositions.

There is taking place in these days an almost imperceptible, but at the same time a very real, change in the position of many municipal tramway undertakings throughout the country. This change is a third phase in the history of tramway development. In the early days we had horse haulage, high fares, and, speaking generally, profitable financial results. With the advent of electric traction we secured greater speed, better vehicles, increased comfort for passengers, immense popularity, and satisfactory returns. Now, at the present day, we in London at least, are being seriously challenged in the matter of speed; are meeting with keen competition in regard to fares; and are being brought face to face with such enormously increased expenses that it behoves all concerned to consider carefully the difficulties which lie ahead, and to use every effort to put our affairs in order, so that the very best financial results may be obtained from our respective undertakings.

The tramcar still "holds the field" as the most efficient mode of street passenger transport for towns and large urban districts; but the conditions of operation are changing rapidly, and new arrangements must be made to meet these changes. Whether among these new dispositions there should be a departure from the recognised policy hitherto followed of granting special and privileged terms to certain classes of passengers is the subject which I propose discussing in the following notes.

Differentiation in tramway fares, in favour of *bona-fide* workmen, has been made compulsory by all Special Acts and Provisional Orders granted under the Tramways Act of 1870. Presumably, in the first instance the "powers that be" considered that, as they were granting at least a partial monopoly in street passenger transport, it was a fitting opportunity of securing for the working classes exceptionally cheap travelling facilities, hoping thereby to assist them to a better and brighter environment for their home life, and for the upbringing of the rising generation.

Now, admirable as this intention may have been, I think that the method adopted was distinctly open to criticism. I submit it was simply a decision to confer benefits on one section of the community at the expense and to the disadvantage of the other.

While tramways were in the hands of private owners it was recognised that to run a service of cars at the compulsory workmen's rates meant *running at a loss;* and because of this such services were kept within the very narrowest possible limits. In many cases one car on each route, running a single journey only—at about 6 a.m.—was all that was provided, the ordinary service coming into operation about 8 o'clock. At the same time, great efforts were made to prevent passengers other than workmen from profiting by these cheap fares. In many cases women were not recognised as "workmen"; and constant friction resulted from the companies insisting that all whose appearance seemed to indicate that they were something other than working men should pay the ordinary fares.

So determined were some tramway companies to go no further in this direction than they were actually compelled to do that I remember when the residents of one district in a certain provincial city petitioned the local company to run a car earlier than the ordinary service began (about 6.30 a.m.), in order to catch a London train, the company only consented to do so on the condition that it should be considered a "special" car, and that the fare should be 6d. instead of 2d. This arrangement was agreed to, and the car ran for years at the higher fare.

It is clear from the foregoing that the men who first took up tramway construction and operation as a business enterprise regarded the compulsory preferential rates for workmen as being inimical to the profitable operation of their undertakings; and, while submitting to the inevitable, did everything in their power to curtail the loss involved.

With the coming of municipally-owned tramways an entire change of policy was initiated in regard to this matter. Encouraged by the low operating costs of electric tramways, with a desire to relieve housing congestion in central districts, and to enable working class people to live in the outskirts, these services were increased to an extent never before dreamed of, and fares were reduced to a level much below the compulsory limit. The increase in the one case, and reduction in the other, has continued, until to-day in certain districts of London (and, I presume, though in a lesser degree, in the provinces also) there is a continuous stream of workmen's cars between 3.30 and 8 a.m., and special cars are run out between noon and 2 o'clock and again between 5 and 7 p.m., to cope with this traffic; and a rate of 10 miles for 2d. seems to be about the average. *In one instance passengers on these cars can travel for a distance of 19 miles at a cost of 2d.* I hesitate to make further comment on this state of affairs lest I should be tempted to use warmer language than might be deemed advisable. Indeed, I am finding that there is more excitement in this subject than I imagined when I began to prepare these notes.

Nor is this all, for owing to the difficulty of enforcing the "artisan, mechanic, or daily labourer" idea, many tramway systems allow *all* passengers boarding cars before 8 a.m. to purchase return tickets at workmen's rates; so that for about, say, one-fourth of the entire working day, all passengers travelling on these systems do so at rates which involve a loss to the undertakings concerned.

In many towns still further concessions have been granted, such as cheap fares for school children, free passes to the blind, free travelling for tramway employees, policemen, special constables, hospital nurses, wounded soldiers, and others, and it seems that the tendency in this direction also continues to grow.

Now I submit that in principle the whole system of differential fares, and free travelling, is utterly wrong; being unfair to the ordinary passenger, unfair to the undertaking concerned, and unfair to the ratepayers, who may some day be called upon to make good a loss—*an unnecessary loss*—on the working of their tramways. I submit that the only true basis for the fixing of tramway fares, as for the fixing of prices in any other business, *is the cost of providing the service rendered*, and that all who avail themselves of that service should be required to pay on a uniform scale.

Why should either men or women going to work at 8.15 a.m. pay twice the amount in tramway fares which others who start half-an-hour earlier are required to pay? The only good business reason would be that it costs less to run the service at the one time than it does at the other. But this is not so. As a matter of fact, many of these workmen's cars are "specials," run out for this particular traffic; and for several reasons familiar to us all these cost more to operate than the ordinary service cars.

Again, why should a highly-paid mechanic be carried for less on a tramcar than a clerk, or shopgirl, or charwoman? Why should schoolchildren have special rates? In my experience this latter only relieves middle-class parents from an expense which they are quite able to bear in sending their children to "select" institutions, some distance away from home, rather than less genteel schools nearer at hand.

Why should tramway employees travel free? They are usually better paid and more comfortably situated than other classes of working men, and the mere fact that they happen to be employed in the tramway service is no good reason why they should not pay their tramfares like other people if they wish to ride rather than walk. I have never been able to understand why a tramway clerk,

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fitter, or cleaner should be allowed to travel free, while the staffs of other departments, *employed by the same Council, are required to pay*. All such concessions are liable to abuse. On one occasion I saw a tramway employee, engaged on night duty, stop a car during the day, board it, travel for a short distance without paying any fare, stop it again when he wished to alight, and his errand was—*the getting of his dinner beer*. This may seem an extreme case, but it is typical of many which have come to my own personal knowledge quite recently.

In the early days of the war many tramway concerns allowed free riding to soldiers, sailors, and nurses; but joy riding became so prevalent, especially on Sundays, and the friendliness which in some cases sprang up, quite naturally, between the soldier and the lady conductor, became so marked, that the privilege had in many towns to be finally withdrawn.

Just here I wish to say that I give way to no one in my admiration for our men who have gone out and performed such glorious deeds in the present war; and I acknowledge unreservedly the indebtedness which we, as a nation, owe to them; but why in the name of common sense should tramways be called upon to liquidate, or assist in liquidating, that national indebtedness?

Again, why should a tramways undertaking, in supporting the wives and families of members of the staff serving with the colours, be called upon to carry ten times the financial burden which an electricity, water, gas, or other department does—simply because it has been able to surrender more men for national service than these other departments? That a Council should set the example to other employers by paying the wages of those who have risked all in the defence of the homeland, is right and proper; but that it should place by far the greater part of this burden on its tramways undertaking is neither logical nor fair.

What the public, and, I fear, even some Town Councillors, seem to forget is that travelling facilities cost money to the department furnishing these, *just as really as any article of commerce costs money to those producing or selling it*. Because of this, there is no more reason why the department should be called upon to supply free travelling facilities than free beer, or free anything else. In providing these facilities the undertaking has to buy cars, construct permanent way and overhead equipment, purchase or generate electrical energy, and hire labour. Now, having done all this, why it should be asked to sell the finished product at less than cost price—or, worse still, give it away for nothing at all—I cannot understand. I know of no other great industry, or branch of commercial enterprise, in which habitual selling under cost price has come to be recognised as the correct thing. In some businesses it may be that one article is sold at cost price or less in order to entrap customers, and with the hope of making a profit out of other goods which they are almost certain to purchase. Thus, in peace times a grocer may sell sugar at or under cost, *knowing* that customers will assuredly buy other goods also on which more or less profit is made. In such a case, although the morality of the procedure is doubtful, the result may be considered to justify the means. At any rate, the purpose is clear and understandable. With municipal tramways, however, *no such temptation exists*, as under-selling in one direction does not lead to increased profit in another, and from the same customers. It merely leads to a loss, for which the department proceeds to try and recoup itself by overcharging other sections of the community. To my mind this is not only bad business, but, from a moral standpoint, is simply indefensible. I am glad to think that, as shown by the various discussions which have taken place recently on tramway fares in general, it is clear that many gentlemen connected with the business are beginning to realise the folly and injustice of the course hitherto pursued, and to feel that a change of some kind is almost imperative. The fact that many of the larger tramway concerns have been so wonderfully successful as to be able to bear the burden is apparently the only reason why the evil has been tolerated so long, and why it has been allowed to grow to such an amazing extent. I think that, if ever stress of circumstances compels us to stir ourselves in this matter, it will be all to the good.

In the foregoing notes I have assumed for the moment that workmen's fares must of necessity involve a loss to any tramways undertaking. While, however, this is generally true, I do not know that it is absolutely so. Fares which result in a loss in one town may conceivably yield a profit in another. No universal dictum can be laid down in this matter. For example, we are accustomed to hear it stated, very emphatically in some quarters, that halfpenny fares *never* pay; and yet I think it must be clear to most people that, given a sufficient number of them, and an all-day spread-over of the traffic, ½d. fares are capable of yielding a very handsome return. Allow me to quote an example in proof of this statement. At Newcastle-on-Tyne a private owner runs a service of horse-drawn brakes over the high level bridge which spans the river, conveying passengers from Newcastle to Gateshead, and *vice-versa*. Only one fare is charged, viz., ½d. per head; and on each journey, in either direction, the proprietor has to pay a toll of 4d. to the owners of the bridge. In spite of this handicap, this service, *supported entirely by ½d. fares*, has been maintained for many years, and presumably does something more than merely pay its way. This owner, at least, has evidently found that ½d. fares are all right—provided you can get plenty of them.

The question of what pays, and what doesn't pay, must be decided entirely by local conditions; and the answer seems to be as difficult to arrive at as that to another I have sometimes had put to me, quite seriously too, viz., "How much does it cost to stop and restart a tramcar?" The fact is that the old adage that "circumstances alter cases" still holds good, and the point can only be decided by a careful survey of the facts relating to each individual undertaking. In my own case I have adopted a very simple formula, which I shall presently set out. It may not commend itself to some others, perhaps because of its very simplicity; but it has merits of its own, and it provides a *safe* basis for determining the "paying point" on any system. If there is anything better in use I shall be glad to know of it. The formula referred to is:—

Let C = total cost of operation, including interest and repayment of loan.
M = total number of car-miles run.
P = total number of passengers carried.
X = cost per passenger per car-mile.

Then—

$\frac{C}{M}$ = Average cost of operation per car-mile, and

$\frac{P}{M}$ = Average number of passengers per car-mile;

therefore— $X = \frac{C}{M} \div \frac{P}{M}$

$$X = \frac{C}{P}$$

Thus, in Walthamstow, we ran last year 1,128,029 miles, at a total cost of £48,952, and carried 12,367,778 passengers. Under the formula given this represents:—Cost of operation per car-miles, 10·415d.; number of passengers carried per car-mile, 10·964d.; therefore cost of operation per passenger per car-mile, ·95d. Of course last year was altogether abnormal, and but for the increased expenses, including payment of war bonuses, etc., etc., the cost of operation would have been very much less.

More than twelve months ago we raised our workmen's fares to the limit allowed by law, i.e., ½d. per mile; but even on this basis it is clear from the above figures that we are still losing nearly ½d. on every car-mile run at workmen's rates. We ran last year 200,000 such miles, and this, I reckon, involved a loss to the undertaking of about £3,750. *If this is so on a small system such as ours, what must the loss be on some others?*

In face of these facts, what, then, ought to be done? First of all, in my humble opinion, steps should be taken by all municipal tramway authorities—but more especially by those whose undertakings are having a difficulty in making ends meet—to raise workmen's fares to the legal limit of ½d. per mile, to cancel all free passes, and to withdraw all special rates. This certainly would only be a lessening of the evil, but it is a change which can be effected at once, without waiting for the doubtful results of organised legal agitation. If this cannot be done—if it is considered necessary for the development of the district, for the social well-being of the working classes, or for any other reason, that differentiated fares should be continued—then let the Council concerned purchase from the tramways department tickets or tokens, *at face value*, and distribute them at a reduced price, or entirely free, as they may consider desirable.

An arrangement of this kind would have several distinct advantages. It would free the tramways department from a very serious, and a very unfair, handicap in the conduct of its business; it would remove the injustice of fleecing one class of passenger in order to benefit another; and, perhaps most important of all, it would enable the public, and members of Council themselves, to appreciate the cost of such concessions—a thing which very few indeed seem to realise at the present moment.

Then I submit that the Executive of our Association ought to seriously consider what steps can, *and should*, be taken to secure an alteration in the laws regarding workmen's fares. If these were unjust thirty years ago, when tramways had at least a nominal monopoly of the traffic, how much more unjust are they to-day, when some of us are fighting against a competition which is under no such obligations, and which refuses—and wisely so—to touch this unprofitable business.

In discussing this matter it is almost impossible for a London tramways manager to avoid having in mind local conditions and difficulties, which are too acute to be even temporarily ignored. However, the safety of the whole can only be secured by protecting the interests of its parts; and after all London's difficulties of to-day may become the difficulties of Bradford, Leeds, Manchester, or Sheffield to-morrow. I trust therefore that the Conference will bear with me if I seem to take a somewhat local and narrow view of this matter.

I say then that, if tramways *must* go on bearing this burden of preferential fares for working men and women, then, in common fairness, they ought to be protected from a competition which is unequal, unnecessary, and grossly unfair. Electricity, gas, and water undertakings, whether owned by municipalities or private

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companies, are protected from such competition. Why then should tramways not only have the competition but be handicapped by impositions and restrictions which are altogether unreasonable and out of date? In view of the position at the present day the official description of the Act of 1870, as an Act "to facilitate the construction . . . . of tramways," reads painfully like satire.

Injustices such as I have pointed out, and others which are familiar to us all, are so glaring that it should be possible to secure redress, notwithstanding the vested interests, or official red tape, which may seek to block the way.

As I have already indicated, up to a certain point we can help ourselves; beyond that point we look to the Association to see us through.

I am convinced that if the Association is going to retain the confidence and support of municipal authorities throughout the country it must devote less time to the consideration of purely academic, theoretical, or even technical questions, and condescend to bestow its thought and energies on matters of more prosaic, but more pressing and general everyday interest. Because of this, while I regret that someone of larger experience and greater influence was not entrusted with the task of introducing this subject, I am glad to have had the opportunity of expressing my feelings on the matter; and I hope that, whatever deficiencies the paper itself may have, the discussion arising out of it may prove helpful to the members of the Association, and of material advantage to the industry in which we are all so keenly interested.

Mr. MURRAY, in presenting his paper, said:—In my notes I have tried to express my opinion clearly and emphatically. When I promised to prepare this paper I realised that probably I was rushing in where angels, in the shape of some of the bigger men connected with the industry, feared to tread, but I feel very strongly that the things I have written ought to be written and ought to be freely discussed and ought to receive the utmost publicity possible within tramway circles. I do not imagine that we shall be agreed on all the points raised, but I do hope that we shall have an interesting and profitable discussion, which will bring us appreciably nearer some much-needed change in tramway law and practice. The gist of the matter in my mind is this, that it is altogether unfair and illogical to differentiate in tramway fares. I am thoroughly in sympathy with the idea of bettering the housing accommodation in our cities and enabling the workmen to live under better conditions, but I cannot see why, if that work is to be done, tramways should be saddled with the expense.

THE DISCUSSION.

Councillor J. MOON (deputy chairman, Plymouth Tramways Committee).—I beg to express my thanks to Mr. Murray for his able paper, which I am convinced contains a lot of food for consideration, especially for tramway managers. There are certain things about which I do not see eye to eye with Mr. Murray. I do not agree that the paper is not likely to excite breathless interest on the part of the delegates. I think the fare question is one of the greatest we have to consider in connection with tramway work. How to adjust the fares so as to give satisfactory financial results, and yet study the interests of the ratepayers is a thing which should excite interest on the part of every delegate present. The writer of the paper refers to the problems, how to increase revenue and to check the growth of expenditure. We must be careful as tramway managers and members of tramway committees not to overstrain the point of revenue earning. Our duty is especially to consider two points, namely, a fair financial return, and the best and most efficient service for the advantage of the ratepayers. The Plymouth Tramways Committee, ten months ago, entirely did away with differential fares, and established a 1d. rate for any distance on any one car. This bold venture has so far been very successful. I quite agree with some remarks of the writer relating to the great competition with which tramway undertakings are faced, but surely, as tramway managers and committees our duty is to face competition by putting our best efforts and energies into our work in the way of improvements and economies, rather than by charging high fares. Perhaps my views of differentiation in tramway fares may not be in accord with the majority of tramway managers here. They are directly responsible for the success, or otherwise, of their undertakings, whilst I and other representatives of the ratepayers have to take a somewhat different view. We have to take a broader outlook. For that reason one has to consider the local conditions relating to parts of towns which are densely populated, and if the density of those areas is detrimental to the health of the inhabitants, it is our duty to try and remove some of those people to the outer areas of the town, even if it is somewhat detrimental to the finances of the tramway undertaking. I agree with my friend as to the folly of legislating for one section of the community by Act of Parliament. This class of legislation should be left to local governing bodies. As to return tickets for all people riding before 8 o'clock in the morning, surely, if tramway managers were to present to their committees the loss incurred by issuing return tickets at ridiculously low prices the committee would cease to do so. I think that, in towns where this has been done, it is very largely the fault of the tramway manager for being so weak-kneed. He certainly should have a stiffer back. (Laughter.) I feel satisfied that no tramway committee would go against their manager who showed them that they were running the tramways at a loss. The Plymouth Tramways Committee has been asked for, and has refused, cheap fares for school children, also free passes for inmates of blind institutions, and hospital nurses. These people apply on the score that they represent charitable institutions, supported by voluntary contributions, and play upon the sympathy of tramway committees. I take the view that, as public representatives, we are elected to our positions to do our work on business lines, and not as a philanthropic society. Regarding tramway employees, we in Plymouth confine free riding to men going to and from work, and I think that a reasonable thing to do. This small concession of riding free makes the employees take greater interest and feel more settled and contented in their work. As to free riding when off duty, that is the fault of the tramway committees and managers concerned; it should be strictly confined to employees going to and from work. Police constables and special constables, in my judgment, should not be allowed free riding. My friend complains of tramway undertakings supporting the wives of men serving with the colours. Tramway undertakings have not been penalised, *pro rata*, more than gas, water, and electricity undertakings. He also infers that exceptions have been made. Surely, the men working in other departments are subject to the same military conditions and regulations as men working on tramways. Mr. Murray says, the public and some town councillors seem to forget that travelling facilities cost money. I admit that there are some who are wishful to carry some classes at a cheaper rate than they ought to be carried. That I am opposed to. Why should a tramway undertaking be called upon to work at a loss any more than electricity undertakings should be called upon to serve certain sections of the community at a loss, or any more than water and gas undertakings should be called upon to supply water and gas to certain sections of the community at a loss? As to getting the Tramways Act of 1870 remodelled and brought into harmony with present conditions I perfectly agree, and trust the Association will support the idea of pressing on their Parliamentary representatives the necessity of annulling or amending this particular Act. (Applause.)

Alderman BROADLEY (Halifax Tramways Committee).—On the Halifax tramways we date our success financially from the introduction of workmen's fares. I cannot understand people with our experience objecting to carrying workmen at reduced fares. Our ordinary seating capacity per car is 60. We carry anything from 60 to 100 on workmen's cars, and if I had my way, they would be carried free. You cannot always have an adequate supply of cars in the early hours of the morning, and on that account discomfort has to be given to this class of riders. Of course we are told the workmen travelling at 8 o'clock in the morning should have the same privilege, and the school teacher says he should have the same privilege at 9 o'clock. If that was followed out, we should have workmen's fares all the day through. You have only to take railway experience, when every railway company thought it worth while to make handsome profits by running special trains. If you load your vehicle full you can reduce your carrying rates, whether for merchandise or passengers. Our experience has been that the reduced fares for workmen have been an unqualified financial success.

Mr. W. J. MCCOMBE (manager, Hull Corporation Tramways).—In connection with his paper I am inclined to blame Mr. Murray for not having properly laid down his principle, and I see he has been rather troubled by misconception as to the theory of tramway fares. The theory of fares is a theory of averages, and that is just what we are inclined to forget. Mr. Murray lays it down in the paper that the true basis for the fixing of tramway fares is that each passenger shall pay the cost of carrying him. That is just the sort of thing that you cannot assess, because the cost of carrying a passenger changes with the time of day at which you carry him. In the morning it costs you very much less to carry a passenger than it does at other times of the day, and between ten and twelve o'clock in the forenoon it is very much more expensive to carry a passenger than at any other time of the day. If Mr. Murray's theory is correct, I submit that it is the passengers between ten and twelve o'clock that ought to pay an enhanced rate. Mr. Murray also finds fault with some municipalities because they charge less than the statutory fare for workmen. May I suggest that that is the business of the particular municipality concerned? We cannot dictate to any individual system at what fare they shall carry workmen. If it suits them and pays them on the theory of averages to carry workmen at less than the statutory rate, that is their business. In Hull we have a very special rate, which is fairly well known: we carry a workman in the morning for ½d. as far as the car goes, which distance is up to 2⅝ miles. We also carry the ordinary passenger at the same rate as the workman, and we have done that for the past nine or ten years. In that way we do not place the workman on a pedestal apart from the ordinary passenger; whatever advantage is going before nine o'clock in the morning is available for the ordinary passenger as well as for the workman. Those who, like our good President, place the workman on a pedestal, and insist upon the ordinary passenger, who is not a workman—even though he gets up at five o'clock in the morning—paying an enhanced rate, take a great responsibility on themselves. Talk about the "bad old days"; the bad old people who made the bad old days have not all died off yet. (Laughter.)

With regard to ½d. fares, I am one of those unrepentant individuals

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who believe in them. I have believed in them for years; and instead of becoming repentant I am becoming more fixed in my feeling that they are justified within certain limits, but every municipality must decide the question for itself. They suit Hull; Hull believes in them. There is not a member of the Hull Town Council who does not thoroughly believe in them. But because they suit Hull, the Hull men do not suggest that they will suit Walthamstow or Burnley. Let Walthamstow and Burnley suit themselves. Mr. Murray has fallen foul, in the last paragraph of his otherwise excellent paper, of the Association, and especially of the executive of the Association. He considers that they have not dealt in former years—and possibly he means the present year—with practical everyday questions. I make bold to say that this Association has been signally successful in dealing with practical questions of everyday utility in connection with their annual meetings. At the same time I must say I am very glad that the Association and the committee have not limited their energies to the discussion of what one might call everyday practical questions. We must have ideas as well as practice; and it is one of the virtues of this Association that they deal in ideas, and that they have some imagination—that they look forward to the future and to what the future may bring for them. I submit that Mr. Murray is very wrong in blaming them for the prescience and imagination which they display; but although I find fault with the paper I wish to thank Mr. Murray for it.

Mr. W. CLOUGH (general manager, Bury Corporation Tramways).—I quite agree with the author that, from a business point of view, no passenger should be carried at less than cost price; but we must not overlook the fact that the municipalisation of tramways was not solely advocated as a matter of finance, and from a municipal point of view there may be good reasons why the working classes should be carried at a lower fare than ordinary passengers and yet not be carried *at less than cost price*. If, by offering a lower scale of fares to the working classes (in the words of the author) "we can assist them to a better and brighter environment of their home life and improve the conditions and the upbringing of the rising generation," this, to my mind, justifies differentiation in fares, within certain limits, and to the municipality it will prove a good investment. The author gives an instance in London of 19 miles for 2d., and when he replies I should like him to tell us whether he has found many passengers who want to travel 19 miles night and morning in a tramcar. (Laughter.) The time, at any rate, makes it impracticable. Before he dismisses the use of workpeople's return tickets, I suggest that he should look again into this question. Personally, I have had them in use for many years, and I prefer 1d. return tickets to ½d. fares. The author asks a question as to war allowances. He asks why should the tramway undertakings pay ten times more than the other departments? Mr. Murray would like you to be consistent. Throughout this paper it has been laid down as a principle that there should be no preferential treatment; that each passenger should meet his own obligation; yet here you suggest that the tramways should run away from their obligation. If the tramways do not pay these war allowances to the ment at the front, who is going to pay them? The employment of these men has formed a part of the tramway undertaking, and now this obligation, which the author describes as "right and proper," is laid on the employers, surely it is equally right and proper that the tramway undertaking should meet the obligations; surely, after laying it down that tramways should be carried on on business lines, he is not going to ask the ratepayers to subsidise the undertaking. If there had been no tramways there would have been no war allowances to be paid.

The author also says that we are accustomed to hear it stated that ½d. fares never pay. I am not one of those who would make such a statement; I think we should be prepared to accept the hypothetical case that, given a sufficient number of them and an all-day spread-over, ½d. fares are capable of yielding a handsome return. But these conditions are only to be found in most exceptional and perhaps imaginary cases, and it is no use—even in Blackpool—building castles in the air.

As regards the high level bridge at Newcastle, I do not think the author has told us the whole circumstances. When you wish to cross the bridge you have the choice either of paying ½d. to ride in the conveyance or of paying ½d. toll and walking. As a matter of fact, this is one of those cases where it is as cheap to ride as to walk; consequently the conveyances are well patronised. At the same time only a quarter of a mile is given for the ½d., so that the conveyance charges at the rate of 2d. a mile. Then I should like to say a word on this formula. (Laughter.) Walthamstow seems to be going in for this kind of thing. (Renewed Laughter.) I find no fault with the arithmetic, but I do not understand why a simple division sum has got to be called a formula. Let us see how he applies the figures. He obtains the cost per passenger per car-mile from the formula: there is only one way to do it. But before he can draw any conclusion from it, he must first ascertain how many passengers he is carrying per car-mile. For instance, he must know how many passengers he is carrying at workpeople's fares before he can say they are not paying for their ride. He gives the cost of operation at '95d., and he assumes that the difference between the ½d. fare for the workpeople makes a loss of practically another ½d. But in this he is assuming that the workpeople's cars only carry an average number of passengers, whereas, certainly in Lancashire, far more than the average number of passengers are carried on the workpeople's cars. There is one figure which he will require to correct—the error may have arisen from the use of the formula; 200,000 car-miles at ½d. do not give a loss of £3,750. The loss I think which he intended to say was a loss of ½d. per passenger per car-mile. From that I should draw this conclusion: do not use the formula. (Laughter.)

Mr. A. ELLIS (engineer and manager, Cardiff).—Local conditions must of course control a matter of this sort. We have heard from a number of gentlemen that the workman's traffic is a huge success: in one case I think the finances of the department are absolutely controlled by the workman's traffic. In our case workmen's traffic produces a monetary loss. We carry a workman any distance for 1d., and the maximum distance is from 4 to 4½ miles. The whole of the Cardiff industries are centred at the docks. We carry very much over the carrying capacity of the cars; but notwithstanding that fact, you can imagine a car going four miles and having receipts of three or four shillings, and then going back empty: that is our experience. In the case of Hull, they carry the people back in the evening.

A MEMBER.—Not at the same fare.

Mr. ELLIS.—We do. We carry them back in the evening at the same rate, with the result that between five and six o'clock, when the ordinary people are anxious to get home, we have to put aside at least 33 cars to carry workmen at reduced rates. While they are paying 1d. to go four miles, people willing to pay 2½d. over the same distance have to walk.

Mr. BISHOP (Walthamstow).—I do not consider the ½d. fare alluded to by Mr. McCombe a workman's fare at all. As to formulas, I do not like Mr. Murray's formula; it is of no use. He saddles his workmen's cars with the cost of running the whole of his cars during the slack portion of the day. Our cars are practically empty from ten in the morning till five in the evening; he saddles his workmen's cars—in which he carries at least 75 per cent. more than he ought to do—with the cost of running those empty cars in the middle of the day. If he will take the workmen's cars alone, and allow for the cost of running the empty workmen's cars back, he will find there is not a loss of £3,000, or anything like it, but that workmen's fares do pay.

Mr. PETER FISHER (general manager, Dundee Corporation Tramways).—In listening to this discussion, supposing I did not know anything about tramways, I must have come to the conclusion that the proper way to make tramways a financial success is to adopt workmen's fares. But, as I do know a little about tramways, that deduction, I feel, would have been out of harmony. In connection with another paper, it was stated that the more fares were reduced the more successful the result. In the small undertaking with which I have been connected for 30 years we have no differentiation of workmen's fares. We have ½d. fares everywhere, and the maximum fare is 1d. The gradients are severe and the expenses are high. There is a great deal in what has been said about cheap fares; there should be no differentiation, but all the fares should be so low as to be workmen's fares. Our undertaking is a gigantic success from the financial point of view; and I think that if, instead of differentiating, you tried having workmen's fares all the day, your finances would improve.

Mr. W. J. SQUIRES (member of the London County Council).—I want to impress on the conference that you must suit circumstances to your conditions and your places. I am going to endorse something I have heard to-day, namely, that I hope we shall not go back to halfpenny fares—(hear, hear)—because I want to use the argument that I do not think it will do in London again. We are not going back to the same conditions which we had prior to the war. It has been a very great pleasure to me to take part in one of the most strenuous discussions in the London County Council on tramway management and fares that ever we had. A special sub-committee was sitting for many days. I had the pleasure of being the chairman of that sub-committee, and I am prepared to say that whatever may happen to the tramways and tramway fares the halfpenny fare has gone, and I hope it will not come back. (Hear, hear.) With regard to workmen's fares, I think one will have to admit that the Government have put on you certain conditions, and I do not suppose the tramway undertakings from choice would have adopted workmen's fares at all, but the Government have laid down that you must take these workmen at certain hours at certain fares, and the London County Council have always been urged very strongly, especially by the Housing Committee, that they were bound to carry the workmen at a low rate, because they had from time to time imposed on the railway companies the necessity to do the very same thing. Our losses on workmen's fares are very heavy indeed. It has been said in the paper that we take a workman 19 miles twice a day for 2d., but 19 miles is the distance out and home. It is not done twice a day. The workman is taken from any of the London bridges to Catford, which is just over nine miles out, and brought back again for a twopenny return fare. In my particular district we have a long route for workmen, and I suppose there is no line of route in this country that is carrying so many workmen as the one which runs from London to Abbey Wood. If you could only see the rush of men, women, boys, and girls in Beresford Square, Woolwich, in connection with the Arsenal. That distance is fourteen and a

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half miles. When we discussed that distance my opportunity came to say this, "Make that route into two distinct journeys," and the Council has done so. That is now a route of fourteen miles reutrn for which the workman, if he travels the whole distance, has to pay 4d. I wish to express to-day how much I feel that you must suit fares and conditions to localities. I have felt it myself over and over again. I want to bear testimony to the excellent work which this Association has done in the past, and which I believe it will do in the future. To-day we have little rumours that you did not take up certain things. It is a time when we all feel there is one thing we must do, and it is possible many other things are going a little on one side if we are to accomplish that great object which we have in view, which I hope will soon terminate in complete victory for England and her Allies. (Applause.)

Mr. MURRAY, in replying to the discussion, said :—In preparing these notes I laid myself out for criticism. Indeed I courted it and I have got it, but I can assure you that I have enjoyed it. I would not have minded a bit if you had gone on for another hour. I was pleased that Councillor Moon has agreed with me in most of the leading points in my notes. I do not think he has seriously criticised any of them, and there is nothing he has said which calls for reply. Then I come to Alderman Broadley. He told us that Halifax scores a big success on workmen's fares. I do not know what the conditions are in Halifax, but as some of the speakers have said of their own districts, we in Walthamstow have to run the outward journey every time practically empty. The traffic in the morning is all inwards. In the evening it is all outwards, and in these conditions we find it impossible to make workmen's fares pay. So much is this the case, that when the Council revised the ordinary fares, they increased the workmen's fares by 50 per cent., and I feel that even now, while the traffic is one with which we are compelled to cope, it is not one which we would ask for if we could avoid it. Alderman Broadley says the railways make a handsome profit out of the workmen's traffic. I would like to know whether that is just the impression he has or whether he can say it is so, because in Walthamstow we had to compel the railway company to provide workmen's fares and cheap trains. In general, I think the railway company favours this class of traffic just as little as tramway managers do. I do not know whether Alderman Broadley's manager agrees with him. Conditions may be different from ours, and I am not in a position to say much about it. With us at all events, workmen's fares have never paid till recently, and it is a moot point now. I come to Mr. McCombe's criticism. He says I have not adopted the true basis in calculating the costs and that the workmen's morning cars cost less to operate than the cars during the day. That is not my experience. My experience is that the workmen's cars, under the conditions in Walthamstow, cost more than the mid-day cars. Mr. Clough very kindly did not criticise my paper seriously, but in regard to war allowances he did not see any reason why tramways should not bear the burden. Take a case in point. My tramway has sent an enormous number of men, relatively to its total staff, to the fighting forces, and we are bearing a burden in connection with dependents' allowances which we can ill afford, unless we are going to become a burden on the rates. Take another department of the Council which sends only five or six men to the national service, while we send about 115. It seems to be unequal that because tramways are able to give these men, another department escapes altogether. I think the burden should be distributed, and if it is right, as I agree, that these dependents should be paid, I think the town ought to pay them and not the department. Mr. Clough spoke about the high-level bridge at Newcastle. His statement is correct, but my argument is that here is a case of halfpenny fares which can be made to pay, provided you get plenty of them and get them all day long. It is quite true that people, if they walk across the bridge, have to pay a halfpenny. With regard to this formula, when I put it down I hesitated, because I knew it would be the subject of criticism. I set it out because the result rather surprised myself and I wanted to make clear to the members of this Association the line of reasoning which I followed in coming to that. I would not be surprised if some member had found fault with the arithmetic, but fortunately it is sound and I do not need to defend it. I am only following the rule of averages and want to get to a safe basis. If there is a margin it is on the right side. Mr. Ellis spoke as to local conditions, and I agree with him through and through. Coming to Councillor Bishop, this is a case of "save me from my friends." He has criticised my comments on workmen's traffic because I have saddled the service with the slack mid-day traffic. I think he is forgetting that the slack mid-day traffic is paying double the rates which the workmen's traffic pays. Overloading such as we have on workmen's cars is not a desirable thing, and in some cases it is physically impossible to collect the fares. I am sure many of us would prefer reasonable mid-day traffic, rather than to have this mad rush which destroys the rolling stock, leads to missing fares, encourages workmen to avoid payment, and gets the conductors into trouble. Another thing against this traffic is that we get the return rush at the busiest time in the evening, and the workmen are being carried at cheap fares at a time when it takes us all we can do to carry the more profitable traffic. All round I am satisfied that workmen's fares are not much use. Mr. Fisher commented on the theory of reduced fares winning success. I do not think that will commend itself to many managers. Because of the change made more than 12 months ago in our fares, including the abolition of halfpenny fares except for children and increasing workmen's fares 50 per cent., our average traffic receipts have risen fully 2d. per car-mile. Instead of having a surplus of £800 last year, we had a surplus of considerably over £6,000. The question is whether municipal tramways should be expected to pay their way or not. I anticipated more trouble than I have met with in connection with this paper, and I thank you for the patience with which you have borne my effort. (Applause.)

A hearty vote of thanks was awarded to Mr. Murray.

The PRESIDENT.—The remaining subject for discussion is one of great importance, namely, the development of tramways. I call upon Mr. Ellis.

DEVELOPMENT OF TRAMWAYS.

BY MR. ARTHUR ELLIS, M.I.MECH.E.

(*City Electrical Engineer and Tramways Manager, Cardiff*).

In complying with the wishes of the Executive Council to open the discussion on this important subject, I feel that I am taking upon myself a certain amount of responsibility, but if as a result free discussion and expression of views of as many as possible attending this meeting is effected, then some good should result to the benefit of tramways generally and the nation at large.

In opening up a subject of this kind, one ought to be a sort of prophet, as so many things are likely to occur after this lamentable war has been brought to a satisfactory conclusion that cannot at the moment be foreseen. There will be many matters that will necessitate serious consideration, and in my opinion the development of tramways is one of the most important, affecting as it does the welfare of the people at large, both in regard to transport facilities and the development of outlying districts effecting increased rateable values, etc. I would therefore offer the following observations for the consideration of the members of the Municipal Tramways Association. In great cities, as street transport becomes more and more heavy, relief will have to be sought beneath the surface to secure much more rapid transit for the longer distance town passengers, which would mean that the surface tramways would be pushed further out beyond the suburban areas into the country, to help forward developments that must come as part of the scheme of freeing our country from the menace of shortage of food, which we have experienced and are experiencing at the present time.

Tramways or light railways have a great part to play in this most serious of all factors, and whatever is done will have to be done by public money, which will mean some sort of public control, both as to construction and working.

After the war, with the railways suffering as a result of depletion of their engines and rolling stock engaged in the clearing up of the effects of the war and the rebuilding of France and Belgium, great openings for tramway undertakings must arise, and it is probable that we shall not see a return of the larger railways catering for short-distance passengers for a long time to come. This, I think, is indicated by the Government taking over the canals and improving these waterways for electric and steam haulage. In fact, taking advantage of every means of coping with the pressure that must arise, the railways thus being freed to deal with the trunk line (passenger and heavier goods and mineral) traffic, leaving to the tramways and converted canals the passenger traffic in and about our cities, and also inter-urban and city traffic up to 15 and 20 miles.

FOOD CULTIVATION.

We became accustomed to seeing long queues in our cities and towns waiting outside certain shops in order to secure limited supplies of a food that is necessary to the working classes and others in the country. The importance of the potato, which possibly was the cheapest known vegetable prior to the war, and in consequence neglected until it became scarce, was clearly indicated, and in order that there should be no recurrence of this sort people, both rich and poor, had brought home to them the importance of allotments, and I think most of us have seen the potato growing in almost every conceivable place, including what were previously beautiful lawns and gardens, devoted either to pleasure or the cultivation of flowers, and the great rush of people to the allotments has made it clear that the Briton has not lost his love of the land, and the continental idea that he is absorbed in business only has been largely contradicted by the rush to make good our shortage of food. These allotments, near to the cities as they are at the present time, will in due course be required for building purposes, and other provision must be made for the now enthusiastic allotment holder, as those who have not previously had the experience, and who have only recently realised the value of the cultivation of their own supplies, are not going to lightly throw it over.

Tramways, or light railway construction, must solve the problem by providing the means of access in the most reasonable space of time, whilst special rolling stock will be necessary for the conveyance of the produce to the local markets or the railway stations and the canal loading stages. Such an arrangement as this would suit the farmer, and be of the greatest possible service to him, and so we

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find that by means of the tramways we should have solved one of the serious problems facing the farmer and the produce merchant. In my opinion, no other form of vehicle can compete on equal terms with the tramcar as regards easy means of travelling, combined with comfort, convenience, etc. They are certainly more comfortable than motor omnibuses, or other forms of road vehicles, whilst the tramcar provides also double the accommodation for shelter against the worst weather, and in some cases, with double-deck cars, as much as four times the accommodation at the same, or less, labour costs. Congestion of traffic has always responded to treatment by adequate tramway facility, and in like ratio it must assist in the development of our breathing spaces in residential districts, factories, and works, which must come if we are to prevent matters slipping back into the hateful conditions prevailing prior to the war.

The people of this country are suffering very acutely at the moment as a result of scarcity of suitable house property, and this will have to be dealt with some time after the war, in consequence of building operations having been suspended for so long a time. The working people of this country, who are better off to-day than ever they were before, and who are likely to continue so, will not remain content by living under the same conditions as those under which they have been accustomed to live. They will want something better, and will begin to look out for suitable accommodation some distance away from their work in order that they might enjoy the benefits of the open-air life during their leisure hours, and the accommodation of our people will have to be a matter for first consideration, and in consequence villages and hamlets will spring up with mushroom-like rapidity in an endeavour to overtake the demand. This will mean that the workers will have a greater distance to travel to get to and from their work. There can be no better means of providing this than by the extension of our tramway systems, and hence we find the lines gradually getting more distant from the centre of the undertakings.

I would give as an illustration the district lying between the city which I represent, viz., Cardiff, and that of the neighbouring town of Newport, consisting of arable and pasture land for the raising of stock. Ten years ago one could hardly contemplate any demand for transport facilities on the high roads, but from time to time there have been applications to the local railway company for the provision of intermediate stations at suitable places, but without any effect. The railway company, instead of reducing their speeds by stops, have regularly and consistently been devoting their attention to the reduction of short-distance stops and speeding up generally, and we find as a result that a company has had to provide the necessary convenience by means of motor vehicles. Whilst these have not been a satisfactory adventure from the passenger point of view, there can be no doubt that they have been a financial success, and that the small fleet of vehicles has been able to provide only a partial accommodation for the demands, whilst at the same time doing considerable damage to road surfaces. Now with miles of splendid land ready for development into steel works, shipbuilding, and factories of all kinds, with railway facilities available, as well as coal and water in abundance, if properly catered for thousands of houses must of necessity be provided between these two towns, which will necessitate provision of tramway facilities that will for a time partake of the nature of urban for some distance from either town, and rural for a short distance, all the time building up the development of the whole, eventually forming a link between the two towns, and carrying a population that in course of time ought to become a teeming one following the great industrial and agricultural development.

This is only one example of many hundreds, if not thousands of others, that must exist at the moment. In my opinion the tramway car ought, and should be, the pioneer in this "after the war development," no other vehicle to my mind being able to give the necessary accommodation at equal cost, and by providing such facilities we shall be performing a duty of national importance. The trunk railways, being freed of short-distance traffic, will be enabled to devote more attention to the conveyance of stores, coal, iron ore, etc., required in the manufacture of things necessary to the rebuilding of the industries of the country, thus making up in some way the shortage of engines, rolling stock, etc., and further, by short spur lines and connections running into the railway yards, and transferring goods brought down by railways to light tramway cars and trailer goods wagons, goods and merchandise, for delivery at short distance in the urban and rural districts, served by the new tramways, and thus we shall be conserving and economising our coal stocks by adding to our electrical haulage facilities, which I think we recognise to-day have not been used in a way nature would have us do.

No argument can entirely demolish those which I have put forward, because I should retort by pointing to the electrification of all lines operating in and around London and other cities, making, as I claim, for convenience generally, together with speed, comfort, cleanliness, and saving of coal. For the passenger rush each morning and evening, what can deal with the problem so easily and cheaply as the tramway trailer car, added to each ordinary car at the necessary time, adding no more to the wear and tear of the roads as motor omnibuses must do, nor adding to the inconvenience of other users of the road, because the trailer car does not race and pass in competition with other cars, but is restricted to its own natural course?

Liverpool has dealt with the matter of goods traffic to some extent, sufficiently to prove its possibilities of development, and other cities are dealing with the goods traffic and mails, and it only remains to decide the form of track and other general equipment of the undertaking to make the town and country tramways both a necessity and an unbounded advantage, because we know that all the new proposals to deal with the new commerce to be handled are, at the same time and principally, for the convenience of the traveller who has to live a distance from the scene of his labours. We know that on holidays and special occasions John Bull and his wife will take pleasure, and nothing is so attractive as a ride through the city and on into the country with its health-giving fresh air, etc., and we have only to quote the increase of motoring between town and town, and local journeys by car, by those whose means permit of such luxuries to realise that at all events it has fed and cultivated the idea of getting to know more of one's country before going abroad.

There is only one point that I should like to touch upon in conclusion, viz., the restrictions under which local authorities and others have to work. If tramways are to be developed, as one would desire, then in my humble opinion it is necessary for some new method to be adopted for affording the necessary means, and the present time costly method of procedure by Act of Parliament should, if not entirely so, at any rate to some extent be modified. Further, that the development of tramways whould be undertaken by local authorities, if not undertaken as a national work. I have no grudge against the company promoters; they have taken their risks in providing the necessary monies for the equipment of undertakings, providing equal facilities; at the same time, however, one cannot neglect the fact that by being undertaken by local authorities they are being so for the benefit entirely and exclusively of the user and for the good of the public at large. This is indicated, I think, at the moment in the suggestion that in due course our railways shall be nationalised.

I feel that I have not done full justice to so important a subject, but no doubt the discussion that will ensue will have the desired result, viz., an expression of the views of a number of gentlemen present as to the best means to adopt for the future development of our tramways after the war in order that a great need shall be provided for the people of the country, and if this is brought about a work of great national importance will have been achieved.

Whilst I am limited as to time by request of the Executive Council, I suggest that the importance of the subject is one upon which many hours of discussion and interchange of opinions might well be spent with great advantage to us all.

Councillor C. RAINE (vice-chairman, Hull Tramways Committee).—This paper opens up such important points that I would suggest that we postpone till to-morrow the discussion of it. (Hear, hear.) I think we would do far more justice to it.

The PRESIDENT.—I think the discussion should be adjourned on account of the importance of the paper and seeing that the hour to-day is so late. If you are agreed on that, the discussion stands adjourned till to-morrow morning.

This was agreed to, and the Conference adjourned till the following day.

FRIDAY, SEPTEMBER 21.

The discussion was resumed on the Friday by

Councillor C. RAINE, who said:—I have read and re-read Mr. Ellis's paper, and I consider that it is one of those which does not make for criticism so much as for general discussion. The author has ventured on lines that are sometimes considered to be dangerous. He has ventured very largely to be a prophet. We know that sometimes that is a very dangerous occupation, but I think in view of the great changes on account of the war, Mr. Ellis has been perfectly justified in lifting up the veil of the future and giving us his views as to what probably may be required after this disastrous war has finished. He has touched on so many subjects of interest that I think it will be quite in the provinces of this conference to look into what he has revealed of the future more than we are doing at the present time. We are all agreed that great changes in every phase of life will be likely to take place, and in no private and public work will changes be more likely to be required than in that of tramway traction. The possibilities that lie before us in regard to the transport of passengers and light goods seem to me to be almost overwhelming, and it is for you who are experts on this matter to be prepared, so that the municipalities may tackle satisfactorily the problems that lie before them. The development of our tramway systems so as to meet the possibilities that will ensue between town and country seem to me to be worthy of the gravest consideration. All towns, more or less, have large outlying urban districts. The great difficulty that I have always seen, and the greater difficulty that I see in the future, is the bringing together of the suburban and the urban so as to be of equal benefit to both. Mr. Ellis very pointedly drew attention to what has

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been done between Cardiff and Newport, and what has been done there ought to have been done, and probably will have to be done, very largely in other areas. In Hull we are peculiarly situated. Some people say that we are isolated and that as a small village on the Humber we stand exclusively by ourselves. But some of us think we are rather an important town or city on the east coast, but, as I say, geographically we are peculiarly situated. Running east and west at the mouth of the Humber, Hull cannot develop on that side, but on the east side, running from south to north, we have thousands of acres of land cultivated in various ways. It is land which cannot, or has not up to the present been attainable by our railway systems. Mr. Ellis's paper has pointed out to me a very large and important vista as to the possibilities in regard to Hull. As I say, we have huge areas of land which are outside of the possibilities of the ordinary railway system. The value of that land and the produce of it is very largely minimised by the difficulties of the farmer in getting his produce to the city. Mr. Ellis hints in his paper at the possibility of tapping these outlying districts by tramways. That is a point that I think should be seriously considered by tramway managers and their committees. In my opinion, regarding our own district, the great possibilities of bringing into the town the inhabitants of these outlying villages and districts and their produce and taking back with them things they require in their homes will, if fulfilled, be a great advantage.

Of course I know that a good deal of the matter in Mr. Ellis's paper is wrapped up with the housing problem and the desire of our workers in the large cities to live a brighter, a better, and a freer life. The catering for our outlying urban districts will very largely solve the difficulties that we who take an interest in the sanitary conditions of our cities feel. The next point I want to touch upon is one that, up to the present, has not been considered. Take your ordinary city. In nearly all cities, probably, we have large congested areas lying outside our main thoroughfares. In Hull, the Housing Committee have had this problem before them from time to time. One part of the city, where scores of thousands of people are gathered together, is outside of the benefits of our tramway system. I would like to see, and I would like to hear from gentlemen present, that there is a possibility of having a light trackless vehicle system that could be utilised on the ordinary roads lying away from the main thoroughfares. We have in this district a large population, with no possibility of laying down ordinary tramway tracks, and it seems to me that these people deserve as much consideration in regard to facilities for travelling as some of us who have the privilege of living on the main roads. Apart altogether from the question of financial benefit to a municipality, we ought to consider it from the point of view that these peoplo have the same right to consideration as others. If any hint can be given at this conference as to the possibility of development in that way by trackless car or other means of locomotion suitable for ordinary or narrow roads, I think some good will have resulted. One can scarcely wonder at the discontent freely expressed in our larger cities when we remember the points I have just brought before you. People are unable to get either to their work or to the centre of the city or to the numerous parks and recreation grounds, because they happen to live away from the main thoroughfares.

Another point, and a very important one, which Mr. Ellis has touched on, has been the outcome entirely of this calamitous war, and that is the growth of the system of allotment holders. These men and women having once experienced the benefit of growing their own vegetables will not abandon the pursuit. I know, also, how the cultivation of flowers not only benefits but raises the whole tone of the man and his wife and his children, and I am one of those who whole-heartedly support the scheme of allotment gardening. Mr. Ellis hints in his paper that these people will not be content to go back to their usual humdrum life, and to have to purchase, through a middleman at exorbitant prices, their vegetables and sometimes their flowers for beautifying their homes, but that they will have a desire to produce these things themselves. That means, if we intend to carry out this allotment scheme in its larger outlook, that we must be prepared to carry our inhabitants further out from the city and provide for their recreation there, without having to put them to the inconvenience of walking, as many of them have to do, or paying fares which are large to them, to get to and from their allotment gardens. Following on that idea, sooner or later, not only will these allotment plots, which are largely within city areas, come within housing and town planning schemes, but I hope that many of the congested areas also will come under such schemes, so that the existing houses in the congested areas may be demolished and, I hope, replaced by factories, workshops, and mills. As one who has taken an interest in health and housing matters, I am looking forward to the use of these allotment gardens and houses for a higher and better and bigger purpose in life than what has hitherto been hoped for.

I know what the difficulties of all municipalities have always been whenever we have approached our suburban neighbours. We generally meet with strong opposition, and very naturally perhaps from their point of view. We have surrounding a city small villages with urban district councils, etc., who live, or try to live, a very exclusive life—I suppose I might say a superior kind of life to that of the town dweller—and they naturally resent any attempt to bring their village or little town within the purview of our cities. But my point with them has always been this, that while they are willing to use all the facilities of a town or city, to get all the benefits of a tramway system and their water and gas supplies, in many cases they are not willing to contribute towards the upkeep of these benefits and facilities which the town provides. But they cannot have it both ways. If a village outside a city desires pure water, and to have gas and other facilities, surely it is right that we should ask these people to contribute in some small measure to the cost of those benefits. But the difficulty has been that we have to go to Parliament to ask a number of gentlemen to give us the power to rope in these villages, and we have to deal with gentlemen who do not know the local requirements. Mr. Ellis has touched on a very important point when he suggests that that power should be relaxed to a sufficient extent to allow local authorities to be the best judges as to what local authorities require. If this is done, I venture to prophesy that very shortly great improvements will be made, not only to the cities but to the surrounding villages which will be drawn within their area. I have no hesitation in saying, as I happen to live just outside the borough of Hull and escape the rates of Hull for my residence, that I would rather pay the higher rates and get the benefits of the police, water, gas, and electricity of Hull, than I would pay the rates of the village in which I happen to reside. If men could be brought to see it in that light, they would prefer to pay for the facilities we could given them. I am very much obliged to Mr. Ellis for his excellent paper.

Mr. A. R. Fearnley (general manager, Sheffield Corporation Tramways).—There are two matters arising to which I should like to refer. Mr. Raine suggests that we should connect up the rural districts by some sort of trackless trolley car or other vehicle. I would suggest to Mr. Ellis and Mr. Raine that they are holding the motor omnibus much too lightly. Mr. Ellis only refers to it on two occasions, and seems to think that it is scarcely worth serious consideration. My experience is totally contrary on this matter. For some four and a half years we have been largely developing the rural traffic round Sheffield by the aid of the motor omnibuses. We have found them most satisfactory vehicles for the purpose, and we have built up a traffic of six and a half million passengers per annum and receipts of £40,000. In addition to that, the motor omnibus is assisting very largely in the development of our tramway system. The majority of the passengers become long-distance tramway passengers and come into the centre of the city. So from every point of view the motor omnibus is worthy of more serious consideration than he has given to it.

The other matter is the development of the existing tramways. I have taken some figures out from a return of information supplied by members in response to a request, a return showing the number of rides taken per head of the population for the last financial year. The following are the figures which I have received :—

Comparative Statement showing the Average Number of Rides taken per Head of Population for the last Financial Year in the undermentioned Towns.

Town	Rides	Town	Rides
Glasgow	338	Newport	124
Sheffield	301	Birkenhead	124
Blackpool	290	Portsmouth	123
Newcastle	260	Dundee	121
Manchester	223	Halifax	120
Rotherham	209	Ilford U.D.C.	120
Bradford	208	Southend	118
Leeds	207	Rochdale	116
Hull	204	Preston	115
Liverpool	203	Derby	113
Birmingham	197	Stalybridge	112
Ashton-u-Lyne ...	196	Wolverhampton ...	110
Cardiff	183	York	110
Huddersfield	181	South Shields... ...	109
Leicester	181	Croydon	105
Belfast	178	Brighton	102
Nottingham	173	Coventry	102
Aberdeen	173	Burnley	98
Leyton	168	Colne	97
Salford	168	Stockport	97
Wallasey	168	Leith	95
West Ham	164	Walthamstow... ...	95
Northampton ...	160	Ipswich	84
Southport	160	Chester	84
Bexley Heath... ...	151	Walsall	83
Bournemouth... ...	149	Warrington	83
Erith	148	Wigan	81
Reading	143	Gloucester	69
East Ham	141	Darlington	68
London C.C.	140	Exeter	68
Ayr	139	Burton-on-Trent ...	65
Oldham	137	Chesterfield	63
Bury	130	Blackburn	59
Sunderland	127	Lowestoft	52

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It is curious to note that there are only some ten towns in which the people are taking over 200 rides per head per annum. There are 41 towns between 200 and 100, and 17 below 100 rides per annum. That suggests to me that there is a good deal to be done on the existing tramways in the way of developing the riding habit. One way is connecting up with other tramways. Through running is responsible for a very large increase in traffic, and in the number of rides taken per annum by the population. If you look at the list you will find amongst the towns with over 200 rides per head of the population per annum some small towns, and I attribute that to the connection or through running which they have with other tramways.

Mr. N. J. YOUNG (general manager, Newport Corporation Tramways).—The time is ripe in my opinion for a general recognition of the fact that the interests of towns and localities lie in housing, town planning and tramways combined. Tramways should be laid out for improvements on garden city lines where land can be purchased at low rates, and if necessary compulsorily, if owners want unreasonable figures. As tramways laid with the prospect of housing would result in a loss for a time, some step should be taken to overcome this. The loss in prospect would be sufficient to deter the tramway manager from recommending the extension. I should say national assistance should be available. Why not divide Great Britain into districts, working under a Government department? It should be our business to obtain a grant or to make grants in desirable cases where housing is the main object. It seems to me that our Association might be moving for such a purpose. I daresay there will be a great deal of work, but even the paid services of a whole-time Secretary would not be insurmountable of attainment. If that were done, I think the expenditure would be well repaid.

Alderman W. C. FENTON (vice-chairman, Sheffield Tramways Committee).—I think the illustrations which Mr. Ellis has given us with regard to the development of tramways in the direction of Newport is very apposite, because it is not merely a local illustration, but one which will apply equally well to scores of places in the United Kingdom. (Hear, hear.) I do not know whether Mr. Ellis had at the back of his mind the thought of the interesting traffic I have observed on that road on a Sunday evening, but in any case it is a very good illustration of tramway development. With regard to the mass of the proposals which he has foreshadowed, I think most of us are in perfect agreement, but there is one suggestion to which I should take the strongest possible objection, and that is that these developments might be undertaken nationally. Whatever may be said in favour of the nationalisation of railways—and I am rather of the opinion, after the experience we have had lately, there will not be quite as much to be said in favour of that as in the past—I think so far as municipal tramways are concerned, even when linked up with others, they are all of a local character and should be dealt with by the local authorities concerned. We have also to look in the face the fact very ably put before us by Alderman Spencer yesterday, that the principal difficulty with which we shall have to contend will be the great difficulty of finance. Mr. Spencer drew a rather gloomy, but I am afraid a correct, view of what is going to happen in the near future. It is all very well for us to talk about extensions of tramways, but we have this one great difficulty to contend with, and I am afraid in that direction we shall require to have national help to enable us to do what is necessary for the benefit of those who live in large cities. That will be so if we are to carry out in anything like their entirety the schemes which Mr. Ellis has foreshadowed to-day. In that case we shall have to be subject to a certain amount of control, but I hope the tramway world generally will very strongly object, and persist in objecting, to any control that interferes with our liberty as to the particular direction in which those extensions shall take place. I think we may get over one of the difficulties mentioned in Mr. Ellis's paper, that is, the difficulty of obtaining sanction for extensions and new systems on account of the cost of Parliamentary Bills. I think probably an outlet in that direction will be found in the suggestion in the new Education Bill for provincial associations or councils. I am hoping that Parliament will provide for some devolution in that respect, which will validate the operation of municipal tramways and other municipal concerns without having the worry and expense of going to Parliament for each extension that may be required. I have always been a strong advocate of a moderate adoption of the American system of laying tramways—that is to say, not to wait for the population to make the tramways, but for the tramways to make the population. (Hear. hear.) It is a somewhat bold scheme, but any man sufficiently far-seeing and knowing his district will agree with me that the tramways are the first prime mover in doing away with the difficulties of slums. If councillors will take up the work in that direction—I have known it to succeed locally, and I am sure it will succeed generally. We ought to go into a bold policy, subject to the financial aspect of making the population by the tramways.

Mr. A. BAKER (general manager, Birmingham Corporation Tramways).—In the first place I think the most important point touched upon in Mr. Ellis's excellent paper is this question of Parliamentary control. (Hear, hear.) The restrictions which the tramways have suffered have been simply monstrous. You know the procedure. Your tramway committee decide that they would like to lay a tramway in a certain district. Having come to that decision they get the approval of the City Council. They must then prepare a Bill and apply to Parliament. They must exhibit notices on all their lamp-posts. They must advertise in the daily Press a considerable number of times. They must brief counsel, and finally they must appear before a Parliamentary Committee, mostly motor car owners who have not the slightest sympathy for tramways and know nothing of the district, and one or two interested persons who do not want tramways coming along from other towns. In the result you are probably floored. I say that is a monstrous state of things, and I think some action should be taken to enable tramways, particularly in towns which have their own systems, to be laid when the tramway owners, that is the City Council, say they shall be laid, without any interference from Parliament whatever. Of course I quite understand some Parliamentary control is necessary where you are laying tramways in two or three different areas belonging to different authorities, because there must be a conflict of interests in such cases. But wherever an authority wishes to lay down a tramway and build up its system, some less costly procedure ought to be possible. Some effort ought to be made by this Association to cheapen the cost and to lessen the difficulties in connection with the construction and development of tramways.

Alderman SPENCER (chairman, Halifax Tramways Committee).—We find ourselves almost in complete accord with the views expressed by Alderman Fenton, but there is one aspect of the subject which we ought to touch upon, and that is the question of goods carrying. We municipalities have always looked on passenger traffic as our great be-all and end-all, but I believe in the future the tramways are going to be the greatest medium of road traffic for goods carrying that it is possible to have. Let me refer shortly to one incident which has brought it home to my mind. I happen to be chairman of a very large company which takes minerals from a point two miles away from Leeds to a point five miles away from the sources of the minerals. We approached the Leeds tramway department with a view to having this mineral carried. At the beginning of the war we found considerable difficulty in getting cartage and in getting motor vehicles. The Leeds Corporation, looking at this from a purely commercial point of view said, "We think something could be done to help you and help ourselves, thus making the interests mutual." We are now carrying over these tramways, through the help of Leeds Corporation, something like 20,000 tons of material a year. So successful has the experiment become that the Leeds Corporation, in their broadmindedness and their anxiety to help the national interest, are laying down for us from another point of our works a tramway which goes across private property. By the assistance of the Minister of Munitions we have been able to get over the opposition of the railway company and have crossed one of the bridges over the railway. We shall at the end of this year be carrying 50,000 tons of mineral per annum. That is a great advantage to the nation, because we have been able to turn out the very first thing in the production of munitions. That is the linings in connection with open hearths. We have been able to turn out the first element in the production of chemical goods, and you can reckon up what 50,000 tons of that material has been as a national asset. We must travel along the lines of making our tramways goods carriers. Our experience has been not merely a financial success to us, but I believe it is a financial success to the Leeds Corporation. You have not to take it from the standpoint only of how much money the Leeds Corporation is getting out of it. You have to take into account the saving in maintenance of the roads. We had 100 horse carts and motor wagons passing over the roads. We have had nearly 80 carts taken off the roads, and the tramways are now carrying the material. Take the cumulative savings. I venture to say that tramways, as goods carrying agencies on high roads, are to be a great national asset in the future.

One other point was referred to by Mr. Fenton in regard to finance, and was also foreshadowed by the writer of the paper. It seems to me that extension of tramways in the future must be entirely based on the national interest, and if we want to extend a tramway merely to carry people to a certain point, unless it is in the national interest to do so we shall not be allowed to do it. We have a form of Treasury control which is exercising a very wise and judicious influence. I believe that control will continue. In France and Germany they have had a similar control for many years. I believe it is going to remain in this country. But do not forget the immense amount of work lying dormant. Look at the great water, sewage, and other schemes. These will involve expenditure by municipalities of a great deal of capital. I think the capital for the extension of municipal tramways will have to come through the Government or out of the reserves of the municipal undertakings. If it comes through the Government it will bring about a form of control. As to Parliamentary procedure, that, I think, we are all agreed is a little too technical and elaborate. What we want is some county form of administration—a form of devolution whereby county boards for tramway or other purposes will appreciate what is necessary in the particular district. A great deal of the expense of Parliamentary promotion can be done away with. What we want is local self-government, with a knowledge of local considerations and difficulties. When we get that we shall be able to forge ahead. As to railways, I believe the great extension of them will be in the shape

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of electric railways. Anyone who has studied the American system knows what a great asset and saving it is, first on account of the low cost of operation, second the national saving of coal, and third the general advantages to be derived from widespread electrification. I think in tramway undertakings we ought to try to save everything possible. In saving let us build up our reserve funds and let us provide for local interests out of reserves by imposing proper and adequate fares.

Mr. A. H. Scott (Highways Committee, London County Council).—My municipal and my tramway soul is in my native city. We in London can neither carry our tramways where we want to carry them, nor when we do get the tramways can we bring the people to the places they want to arrive at. But there are more advanced municipalities than that of London, and it is to them that I wish to speak. I quite agree with Alderman Spencer. We have to turn our tramway undertakings more into the nature of lines for the conveyance of goods, and it is on this special point that I want to speak to the representatives of the tramway undertakings of enterprising municipalities. These municipalities own their markets. The conveyance of agricultural produce to the market is one of the greatest taxes on the food of the people. (Hear, hear.) I can see a tramway undertaking utilising its rails and freight cars; the freight cars could be uncoupled at the Corporation market, and by their use not only would there be a saving in the road maintenance, but a saving of enormous expenditure on the cost of the food in that particular locality. When I went to America first, years ago, to inquire into this question, they told me that if you start a tramway in the prairie and get a long distance line, that will be the most profitable. In all the inquiries I have made in this country since, I have always found that the biggest return is on the longest journey. Therefore I think if we can show in these agricultural districts that we do not only consider the needs of the towns, but also wish to benefit the agricultural districts to which we want to have access, a great deal of our difficulty will be removed. (Applause.)

The President.—I think the time is so short that we cannot afford to spend more on this paper, but Mr. Ellis will probably want to say a word in reply. I would just make a remark on a suggestion in his paper. He speaks of the relief of congestion for through cars in large cities. He thinks that the delay in the centre of a city is insuperable without tunnels or some such relief. Recently Manchester has been inquiring into that question, and I believe they have come to the conclusion that tunnels are out of the question on account of their cost. I wish to make this suggestion. I think there should be a provision of shunting loops with automatic points to allow through cars to pass the shuttle cars. There is one reference at the end of the paper which ought to be deleted. The author makes an apology for putting forward his suggestions. I never read a paper more fruitful. (Applause.) Therefore I think we should delete the apology from the paper.

Mr. Ellis, in reply, said:—I appreciate very fully the kindly remarks which have been made. I anticipated, of course, that I should be very badly slated. One realises that in being asked to open a discussion, the discussion is generally limited. If I had been asked to read a paper on the subject I possibly would have refused, because it is a subject on which one could talk for hours, if not days. Councillor Raine spoke of the value of the land cultivated. Of course, that is accepted by everybody, and that value is going to be continued in the future after the war. He mentioned the question of trackless trolley cars for districts lying behind our main arteries. That is a matter for the consideration of the local authorities. There is no reason why they should not be developed if considered necessary. He touched on the question of the development of city areas for factories and works, and taking the housing outside to be the suburban districts. The opposition of neighbouring councils will have to be got over some way or other. It is handicapping the development of tramways very seriously.

Mr. Fearnley mentioned his experience in Sheffield with motor omnibuses. He is to be congratulated on the large number of passengers he carries and the excellent receipts he is obtaining. Possibly in the near future he may come to the view that it is time to extend his tramways and take his omnibuses further out and continue the development which has been so satisfactory in existing areas. As regards the remarks of Mr. Young, personally I would like to see the exchange of running facilities between Cardiff and Newport, but here is the difficulty. If they wanted to obtain these facilities they would have to go to Parliament, and the powers might be refused. What happens? A local omnibus company comes before a local licensing committee, gets the licences, and the next day the omnibuses are running. Alderman Fenton mentioned the question of Sunday evening traffic at Cardiff. Cardiff is somewhat peculiarly situated. One edge of the city is on the boundary of the county and is also on the boundary of England and Wales. In Wales public houses are closed on Sundays. (Laughter.) By walking along this road about half a mile you can get a drink under the same conditions as in England on Sunday, but there is no desire on the part of the City Council to cater for traffic of that nature. It is not by any means desirable, and we hope that the restrictions now prevailing inside that boundary will continue after the war. The district is more fit to live in than it was before. In regard to difficulties of finance, these will have to be contended with and, we hope, will be surmounted. But what I want to avoid is dual control of the roads. As regards national control, I only suggested it as an alternative to control by municipal authorities, which is desirable from every point of view.

Alderman Spencer has touched on the important question of the development of goods traffic. I am highly interested in what he has told us of his personal experience and of the arrangements with the Leeds Corporation. This opens up rather a fine point, namely, the difficulties of obtaining powers for concessions. What happens now, owing to the war? Mr. Spencer is interested in a factory, Leeds Corporation are interested in their tramways; this factory wants a line laid to get its goods taken away quickly and under improved conditions; they do not have to go before Parliament, they do not have to bring witnesses, and they do not have to incur heavy expenditure. They go to a business man at the Ministry of Munitions, put their proposals before him; he sees the proposals are of a business-like character, and he says "Go ahead." He also obtains wayleaves over railways in districts called "No man's land," which are always the most difficult in which to get wayleaves. What a pity this sort of thing cannot be continued after the war, so that local authorities might go to a business body of men and get what they want. On the question of county boards of control, that would be desirable if it could be developed.

Mr. Scott spoke of the carriage of goods to markets. That is an important matter. As to the extension of tramways into the prairies, we agree; we have had the experience ourselves. We find that if we lay a cable along a road likely to be developed for house property, the people who build the property take a supply of electricity. But if you wait till the houses are built and have gas in them, the people will not afford the expense of taking out the gas and putting in electricity. The same applies to tramways. We ought, if possible, to protect the people against enhanced land values through the development of tramways. (Hear, hear.) That is what represents the greatest obstacle. As soon as there is a suspicion that a municipal authority or a company intends to extend its lines, the individual holding the land, or someone who hears of the proposal and purchases the land, puts up the price until it becomes prohibitive, with the result that the development is not carried out. (Applause.)

A hearty vote of thanks was accorded to Mr. Ellis for his paper.

This closed the conference proceedings.

MEETING OF MANAGERS.

A meeting of the Managers' Section of the Association was held on Friday, September 21, with Mr. Mozley in the chair, when it was unanimously agreed that the managers' spring meetings should be resumed, and that the next meeting of the kind should be held in Birmingham.

EXTRAORDINARY MEETING OF THE ASSOCIATION.

Constitution of Officers.

An extraordinary general meeting of the Association was held subsequently, when a resolution was passed confirming the alterations in the articles of association which had been passed at a general meeting in London on August 31, 1917. The amended articles refer to the constitution of the officers of the Association, the chairman at the meetings of the Association, and the chairman of the Council.

That the following articles be substituted for Articles numbered 21, 25, and 47 of the Articles of Association, that is to say:—

Officers.

Art. 21.—The officers of the Association shall be the president, vice-president, chiarman of the Council, honorary solicitor, and secretary or honorary secretary, and treasurer or honorary treasurer, and such others as may be from time to time decided upon after due notice at the annual general meeting of the Association, provided that no person shall fill the position of an officer of the Association unless he shall be a member of the Association, except in the positions of secretary and treasurer, and honorary solicitor, which offices may, if desired by the Association, be held by persons who will not be members of the Association. The first honorary secretary shall be Arthur Robinsen Fearnley, general manager of the Sheffield Corporation Tramways.

Art. 25.—The president, on vacating office, shall become an *ex-officio* member of the Council for three years, provided that in the event of the president or vice-president being continued in office for a longer period than one year, as provided by Article 24 the *ex-officio* membership of the Council of the ex-presidents shall be continued for such lengthened period.

Chairman of Meetings of the Association.

Art. 47.—The president for the current year, or, failing him, the vice-president for the current year, or, failing him, such member of the Council as the meetings shall appoint, shall take the chair at all general meetings of the Association and shall direct the proceedings. If no member of the Council is present at a general meeting, any member present may be appointed to take the chair. The decisions of the chairman on all questions of order and procedure shall be final.

That the following new clause be added after Article 47:—

Chairman of the Council.

Art. 48.—At the first meeting of the Council held after the annual general meeting of the Association the Council shall appoint one of their number to be chairman for one year at all meetings of the Council at which he is present. If the chairman is absent from any meetings the members present shall appoint one of their number to act as chairman in his stead.

That the numbers of the Articles of Association from 48 to the end be raised accordingly.

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ANNUAL BUSINESS MEETING.

The sixteenth annual general meeting of the Association was held on Friday, September 21, following the extraordinary meeting reported above.

ACCIDENT TO A MEMBER.

The PRESIDENT.—Before we proceed to the business meeting, I have a letter to read. Some of you know that Bailie Buist, of Dundee, met with an unfortunate accident yesterday, and he is unable to be present to-day. I am sure it would be in order for the honorary secretary to convey a message to him from this meeting and a wish for his recovery. He has written to me as follows:—

"Dear Mr. Mozley,—I regret that the accident I met with yesterday prevents my being present at the annual meeting to-day, as I wished very earnestly to impress on the Association that we in Dundee trust that the annual meeting of the Association will be held in Dundee at the earliest possible opportunity after the war. Though the year of Mr. Fisher's presidency has passed, your promise to come to Dundee has not, and we therefore trust that whoever is president when the war ceases will waive his right to have the meeting in his own town, and allow you to come and visit a northern town, pleasant in situation and unsurpassed for tramways. Believe me, yours sincerely,

"WILLIAM H. BUIST."

The PRESIDENT.—The first item is the report of the Executive Council. I have to call your attention to the unfortunate loss which this Association has suffered from the death of Alderman Miles and Alderman Brodie. I need not say anything to you of the admirable qualities of these two grand men, but I ask you to stand up as a mark of respect and honour to their memory.

The members stood up in silence.

The PRESIDENT.—The report of the Executive Council is now before you, and may be discussed.

[The report is given on pages 267 *et seq.*]

Alderman J. BOWES (chairman, Manchester Tramways Committee).—I move that we accept and adopt the report as printed.

Mr. J. F. SIMPSON (engineer and manager, Preston) seconded the motion, and it was carried unanimously.

The statement of accounts was also submitted and agreed to.

Mr. A. R. FEARNLEY.—There are vacancies on the Executive Council for three councillors and two managers. The councillor who retires is Alderman Spencer, and he is eligible for re-election. The managers who retire are Mr. Baker and Mr. McElroy, both of whom are eligible for re-election. The other vacancies are caused by death and promotion to other positions. The councillors to be elected may be aldermen or bailies.

The PRESIDENT.—The first business is to elect the president for the ensuing year, and it is one of the privileges of the chair to make the proposal. Happily we have no difficulty in selecting Alderman S. Flint, J.P., chairman of Leicester Tramways Committee, who has been our vice-chairman for the past year, and who has been of great service on the Executive Council. I have much pleasure in proposing him as president for the ensuing year.

Councillor HEAP (Burnley) seconded the motion, and it was carried unanimously.

Alderman FLINT, in replying, said:—I thank you very sincerely for the honour. I have never sought it; it has been rather thrust upon me. I regret very much the occasion which has opened up the necessity for it, namely, the loss of our friend and colleague, Alderman Miles. He was a man we all admired for his energy and straightforwardness and devotion to the work. I did hesitate in allowing my name to come forward, even as vice-president. I felt I could not fulfil the duties of president, but with such able colleagues as I have I hope to get through with satisfaction to you. I shall do my best (Applause.) I now have the privilege of proposing for the vice-chair during the year Mr. T. B. Goodyer, manager, Croydon. (Applause.) His name is admirably received in every quarter. He is a favourite among us all. Those who have met him for many years on the Executive Committee are perhaps better able to appreciate his ability and character than those who know less of him.

Councillor BISHOP (Walthamstow).—Mr. Goodyer is a favourite with everybody, and as a representative of the south I have the greatest pleasure in seconding the nomination.

The motion was carried unanimously.

Mr. GOODYER.—I thank you very much indeed for the high honour you have conferred on me, and I shall do my very utmost to merit your selection. (Applause.)

The PRESIDENT then called for nominations for the three vacancies for municipal representatives on the Executive Council, and the following were nominated:—Alderman Wood (Stalybridge), Alderman Spencer (Halifax), Councillor R. Mayne (Newcastle), Councillor J. Timpson (Portsmouth), and Alderman Wylie (South Shields). A ballot was taken, with the result that Alderman Wood, Alderman Spencer, and Councillor Mayne were elected. Mr. A. Baker (manager, Birmingham) and Mr. J. M. McElroy (manager, Manchester) were elected as the managerial members on the Executive.

Mr. A. BAKER.—In regard to the treasurership, as you are aware Mr. C. J. Spencer, of Bradford, who has acted as honorary secretary for so many years, and with such conspicuously good results—(hear, hear)—unfortunately has had to retire from the position owing to Government work which he has taken up. Mr. Spencer has rendered magnificent service to this Association, and we feel it would be a very distinct loss if we were to allow him to retire from the Executive. At present he is not a member of the Executive Council, but there is a way by which we shall be able to retain his services and valuable advice. The position of secretary and treasurer is now vested, for the time being, in the hands of one gentleman, Mr. Fearnley. He is quite competent to fill the bill, but we think it is desirable, in order to secure the services of Mr. Spencer, that we should elect him as honorary treasurer, Mr. Fearnley continuing the office of honorary secretary. I accordingly move that Mr. Spencer be appointed honorary treasurer.

Alderman E. PRIESTLEY (Bradford) seconded the motion, and it was unanimously agreed to.

The PRESIDENT.—We now require the services of an honorary secretary, but we all know we have only one, and that is Mr. Fearnley. I shall nominate him. You know his value, and I need not enlarge on it.

The motion was carried unanimously.

On the motion of Councillor HEAP (Burnley), Mr. Simpson was unanimously reappointed auditor, and on the suggestion of the President the Town Clerk of Liverpool and the Town Clerk of Ilkeston were appointed honorary solicitors.

Alderman G. BANTON (vice-chairman, Leicester).—I would suggest that the Executive should take into consideration the advisability of having three days for our conference. There has not been a fair opportunity this time for the discussion of some of the valuable papers we have heard. I would also suggest that we should ask some of the engineers to bring forward the electrical side a little more prominently, considering the vast importance that it has on the work of the Association.

Alderman S. Flint, J.P.

The New President of the Municipal Tramways Association.

Alderman SPENCER.—It occurs to me that when sending out papers, gentlemen should be asked to put down their names if they wish to speak. We should then know how long the discussion would take, and whether it would be advisable to carry it over to another day.

The PRESIDENT.—The Executive will take into consideration these suggestions. In the days before the war we did meet for three days, and very often we were pressed for time then. In the future business will be of growing importance, and probably the Executive will decide in favour of three days.

Alderman FLINT.—I beg to move a vote of thanks to the president for the way in which he has discharged his duties during the past year. He is a *persona grata* to all of us, owing to his geniality and good temper. He has endeared himself to all of us, and when we think of the way in which he has discharged his duties we are filled with admiration. Last year was one of the worst years in carrying on the work of this Association. We have been deprived of the services in large measure of some of our colleagues, so that the work has devolved almost entirely on the president and the secretary. The president has devoted himself admirably to the work of the Executive Council as well as to this conference. No one could have done the work better. He is a practical man, and he knows the ins and outs of the whole thing. He has been at the service of the

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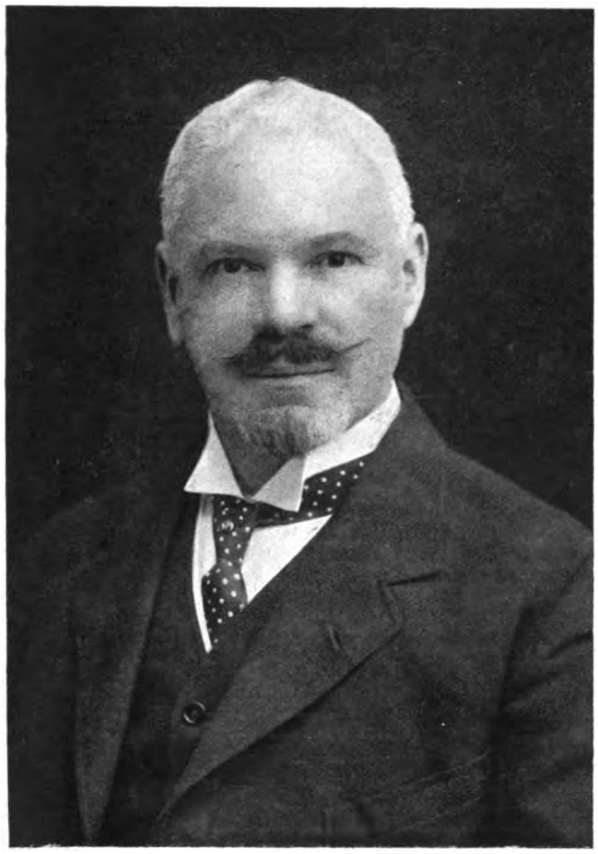
Association, and has devoted himself to the work most untiringly and thoroughly. I have great pleasure in moving that our very best thanks be offered to him for his services.

Alderman WYLIE.—I second that motion with great pleasure. I am sure we all appreciate very much the manner in which the president has conducted the business during the past year. I trust that now he joins the ex-presidents we shall long have him among us to give us the benefit of his experience.

The motion was carried unanimously.

The PRESIDENT.—I give you my most hearty thanks for the very kind and appreciative way in which you have proposed and carried this vote of thanks. I need not say much except that it has always been a pleasure to me to assist at our conferences, and especially during the past year the work has been most pleasant. We have had many useful meetings of the Executive Council, and we all realise that in the immediate future there is more important work, and I hope I shall be spared to give what assistance I can. (Hear, hear.) We all know that during this tremendous war we have had many anxieties, and it has been a great pleasure to me to know that we are keeping our end up in this country, that we are not getting downhearted, that we are maintaining our businesses as far as practicable in first-class condition, ready for the boys when



Mr. T. B. Goodyear.
Vice-President, Municipal Tramways Association.

they return home, and when they will find we have not been neglecting their interests. I have again to thank you, and to say how glad I am that I have been allowed to hold this position. (Applause.)

Alderman F. A. DUNSFORD (chairman, Southampton Tramways Committee).—I have much pleasure in moving :—" That the best thanks of the Municipal Tramways Association be given to the Blackpool Corporation and to the Mayor and the chairman and members of the Blackpool Tramways and Electricity Committee for their cordial reception, for the splendid facilities afforded to the delegates, and for their generous hospitality during our stay in Blackpool ; to Mr. Charles Furness, borough engineer and tramways manager, and his assistants, for their efforts in assisting in making the conference so enjoyable and successful ; and to Mr. J. Cameron and Mr. H. W. Laing for the greatly appreciated facilities extended to the delegates."

The Mayor, in welcoming the conference yesterday, talked of Blackpool breezes ; we have experienced the breezes, and this morning we are experiencing them in a more gentle way. There is only one cloud over us, and that is the missing of Alderman Brodie, who was an original member of the Association. That the conference this year has been a great success we are all agreed.

Councillor FRYER.—I have much pleasure in seconding this motion. When the Mayor, representing the Corporation of Blackpool, came here yesterday to extend a welcome to this conference, we listened with pleasure to his sincere and kindly remarks, and the conference has reason to value the generous manner in which his Worship bore testimony to the importance and far-reaching character of the work of this conference. The conference, I am sure, will feel it appropriate if I say a word or two about the public spirit and go-ahead enterprise of the Corporation of Blackpool. No effort has been spared in this borough for a number of years to improve and to adapt all the local advantages. We know to what an extraordinary extent this Council has succeeded. We as tramway people feel that they have anticipated one of the chief movements of the future. That is the special track and the single-deck car. They are a go-ahead people, and the conference has done well to come here. We would like this motion to be taken as a sincere expression of our appreciation and gratitude for the good things done for us in Blackpool.

The motion was carried unanimously.

Mr. CHARLES FURNESS (general manager, Blackpool Corporation Tramways).—It gives me great pleasure to say how pleased the Mayor and the Tramway Committee are to welcome you to Blackpool. It is part of the business of Blackpool Corporation to receive visitors. We have no industries here ; we take people in—(laughter)—but we take them in in a very nice way. I hope we have taken you in and made you very welcome. (Applause.)

Mr. A. BAKER.—We are forgetting our honorary secretary, the man who stepped into the breach when Mr. Spencer had to decline the duties, and we know no better man could occupy the position than Mr. Fearnley. (Applause.) Mr. Fearnley had a spell of five or six years as honorary secretary before Mr. Spencer came in. We know how he did his work then, and we know how he is doing it now. I am sure you would not like this conference to break up without expressing our hearty thanks for the work Mr. Fearnley is doing and in anticipation of what he will do in the future. (Applause.)

Mr. HOLFORD seconded the motion, and it was carried unanimously.

Mr. FEARNLEY.—I am exceedingly obliged to you, and I am delighted to do anything I can for the Association. It is a pleasure to take the place of Mr. Spencer for the time being, and I will continue it this year and do all I can for the Association. (Applause.)

This concluded the business.

ANNUAL REPORT OF THE EXECUTIVE COUNCIL.

The report of the Executive Council on the work for the past year was as follows :—

ANNUAL CONFERENCE.

Due to the continuance of the European war, the council decided, on the suggestion of the president, to hold business meetings at Blackpool in lieu of the usual annual conference, devoting one day entirely to the discussion of papers and the second day to the annual general meeting.

RESIGNATIONS.

The following have retired from the Association during the year :—

Ilkeston Corporation.

L. C. F. Bellamy, borough electrical engineer and manager. Ilkeston Corporation Tramways.

W. Boot, Rolling Stock Superintendent, Nottingham Corporation Tramways.

C. W. Mallins, General Manager, Liverpool Corporation Tramways.

OBITUARY.

The council regret to record the deaths of Ald. J. Miles, J.P., chairman of the Bolton Corporation Tramways Committee, late vice-president of the Association ; and of Ald. J. Brodie, J.P., chairman of the Blackpool Corporation Tramways and Electricity Committee, who had been members of the Association for a number of years.

MEMBERSHIP.

Appended is a summary of the members for the past two years :—

	1915-16.	1916-17.
Honorary members	1 ...	1
Local authorities	76 ...	75
Managers and assistants	112 ...	109

MEETINGS OF THE EXECUTIVE COUNCIL.

Seven meetings of the council have been held since the last annual meeting—at London, Manchester, Sheffield, and Bradford. There have also been a number of meetings of special committees and sub-committees appointed to deal with specific matters, who have reported to the council periodically.

MOTOR OMNIBUSES—INCOME-TAX ASSESSMENTS.

A joint committee, comprising representatives of the Municipal Tramways Association (Incorporated), the Tramways and Light Railways Association, the London Omnibus Owners' Federation, the Provincial Omnibus Owners' Association (Incorporated), and

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the Institute of Municipal Treasurers and Accountants (Incorporated) have been in negotiation with the Chief Inspector of Taxes, with a view to an agreement as to the proper allowance to be granted in respect of the wear and tear of motor omnibuses.

As the result of these negotiations the Board have agreed to the following proposals :—

(*a*) That the allowance for the four years commencing with 1916-17, in addition to any appeals at present outstanding for prior years, be 20 per cent. on the written down value.

(*b*) That at the end of the said period the rate be reconsidered.

(*c*) That as regards excess profits duty cases, inasmuch as the rate is intended to be regarded as a special rate necessitated by the war, it be applied to all accounting periods where claimed.

(It should be noted that where more than 20 per cent. is already being allowed the reduced rate is to be applied.)

These proposals do not apply to commercial motor vehicles.

Mr. J. M. McElroy (Manchester), and Mr. C. J. Spencer (Bradford) are the representatives of the Association on the joint committee.

Third Party Insurance.

As a result of various inquiries from motor omnibus operators, negotiations have taken place with the Accident Offices Association with a view to an alteration being made in the method of insuring motor omnibuses. After consideration, the committee of the above association have signified their intention of dealing with future cases of insurance in the manner suggested by the association, namely, upon the basis of receipts and mileage.

Inter-connection of Electric Supply Undertakings.

The council have had under consideration memorandum of the National Electric Power Supply Joint Committee (being a committee appointed by the Incorporated Municipal Electrical Association and the Incorporated Association of Electric Power Companies) regarding the appended circular letter of the Board of Trade, dated May 25, 1916, on the subject of inter-connection of electric supply undertakings : —

"Board of Trade (Railway Department),
"7, Whitehall Gardens, London, S.W.,
R.C. 1334. "May 25, 1916.

"Sir,

"Inter-connection of Electric Supply Undertakings.

"The Central Coal and Coke Supplies Committee have had under consideration the increasing difficulty in providing for the supply of coal to important consumers, and have advised the Board of Trade that in view of the possibility of a serious shortage in the near future every practical economy in consumption should be adopted without delay.

"In this connection the Board desire to call attention to the very considerable saving that can be effected by the adoption of arrangements for inter-connection and joint working of electric supply undertakings, including inter-connection with stations supplying tramways and railways.

"The Board are aware of the difficulties involved at the present time, particularly in regard to labour and materials, but they are advised that in many cases the necessary arrangements could be made at once, and they wish therefore to urge upon electric supply undertakers the necessity in the national interest of taking immediate steps to avail themselves to the fullest possible extent of the powers which exist for the purpose.

"Any application which may be made to the Board of Trade for their approval of such arrangements under the powers conferred on them by the Electric Lighting Act, 1909 (Section 4, sub-section 3), and the London Electric Supply Acts, 1908 and 1910, will receive their immediate attention.

"The Board are prepared to assist as far as possible in cases where difficulty is experienced in securing the agreements of all the parties interested in any proposed scheme or in arranging the terms and conditions under which it shall be carried out.

"I am, Sir,
"Your obedient servant,
"W. F. Marwood."

The council expressed themselves in favour of the principle of linking up, and offered to illustrate where such inter-connection had taken place with public advantage.

Insulation of Post Office Wires.

A communication was received from the General Post Office, dated December 8, 1916, respecting the agreement arrived at in 1913, whereby insulated wire instead of bare wire is provided at crossings, and pointing out that owing to the increased cost these charges do not now represent the amount due from the tramway undertakings on the basis then arranged, and it was suggested that the charges of 11s. 6d. per circuit where the Postmaster-General is first comer, and of 5s. 9d. where he is second comer should, owing to the extra cost involved, be increased to £1 and 10s. respectively ; the revised charges to come into operation on January 1, 1917. The cost and the propriety of the relative charges to be examined from time to time.

It was agreed to recommend the members to pay the extra cost suggested for the provision of insulated wires under the present circumstances.

Lights (Vehicles) Order, 1916.

The Order of the Secretary of State, dated October 19, 1916, framed under Regulation 2 of the Defence of the Realm (Consolidation) Regulations, 1914, as to lights on vehicles in places outside the Metropolitan and City of London Police Districts provided (*inter alia*) as under :—

(1) Every vehicle on any street, highway or road to which the public have access in any part of England or Wales, excepting the Metropolitan and City of London Police Districts between half an hour after sunset and half an hour before sunrise must carry lamps as follows :—

(*a*) At the front, a lamp or lamps displaying to the front a white light. If only one lamp is carried for this purpose on any vehicle other than a bicycle, tricycle or handcart, it must be placed on the extreme off, or right-hand side of the vehicle ; if a second lamp is carried it must be placed in a corresponding position on the extreme rear, or left-hand side of the vehicle, and

(*b*) At the rear, a lamp displaying to the rear a red light. The lamp carried for this purpose on any vehicle other than a bicycle, tricycle, or handcart must be placed on the off or right-hand side of the vehicle.

In face of the attitude of certain chief constables in the country, negotiations were opened with the Home Office, and the assurance was given that their communication, dated January 22, 1916, exempting tramcars from the Order, dated December, 1915, as to the position of lights still held good, but that the Home Office felt that some modification of tramcar lighting would have to take place.

A deputation, comprising the President (Mr. H. Mozley), and Messrs. J. B. Hamilton, J. M. McElroy, and C. J. Spencer, had an interview with Mr. A. L. Dixon at the Home Office on November 3, 1916, and after discussing the whole position both from an operator's and pedestrian's point of view, it was agreed on behalf of the Home Office to recommend that tramcars be exempted from the recent Order, and an undertaking was given that chief constables in the various areas would be notified. The opinion was expressed, however, by the Home Office that a gradual application of the Order would probably have to take place, but before anything was done in that direction opportunity would be afforded tramway operators to discuss the matter.

Tramcar (Interior) Lighting.

The question of tramcar (interior) lighting having become a very serious matter throughout the country, due to the restrictions imposed by the military authorities in certain districts, a communication was sent to the Board of Trade drawing their attention to the number of accidents in connection with the operation of tramcars on the various undertakings, and pointing out that it was quite unnecessary to have the cars darkened to the extent insisted upon, especially on those undertakings away from the danger zone, having regard to the fact that it was possible to cut off the current from the line at a very short notice.

The president (Mr. H. Mozley) and Mr. J. B. Hamilton (Leeds) had an interview with Mr. A. L. Dixon (Home Office) and the Hackney Carriage Inspector for the Metropolitan Police on December 29, 1916, when the undermentioned scheme was put forward :—

(1) That normal lighting should be granted to tramway operators on account of it being possible to cut off the whole of the current at the power station. They were therefore in the same position as munition works and controlled firms, in which cases there were no restrictions of lighting. The advantage to be derived from the additional lighting would be the general brightening up of the streets and consequently safer conditions for pedestrians, tramway passengers, and vehicular traffic.

(2) That if they were unable to grant this, a greater amount of light should be allowed to be shown from dash lamps. The necessity for this is evidenced by the frequency of pedestrians being run down by street cars.

The following communication was subsequently received from the Home Office :—

"Home Office, Whitehall, S.W., March 20, 1917.

"Sir,

"In reply to your letter of the 7th inst., regarding the lighting of tramcars, I am directed by the Secretary of State to say that chief officers of police have been authorised to allow the use of such lights on tramcars as they consider necessary for safe driving, providing arrangements are in force for extinguishing, within five minutes of the receipt of warning of the approach of hostile aircraft, all lights except those which must be retained to indicate the position of the cars whilst they are being run back to the depots or remain stopped in the streets as the case may be.

"Instructions to this effect have been issued since the interview to which you refer.

"As regards headlights, they have been instructed that it is not advisable for bright unscreened headlights to be used under the

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present conditions of street lighting, in view of the danger of pedestrians and drivers of other vehicles being dazzled thereby and prevented from seeing where they are going.

"From reports received from chief constables and from personal enquiries in one or two of the larger provincial centres the general opinion appears to be that a satisfactory driving light is obtained by covering the headlights (if these are of ordinary power) with a light coating of paint or distemper, and this avoids the danger caused by the use of unscreened headlights.

"As regards tramcars in the Metropolitan Police District, the Secretary of State understands that the London County Council have dispensed altogether with the use of headlights on their cars, and that headlights obscured as above are used on other tramway systems with satisfactory results.

"I am, Sir,

"Your obedient servant,

"(Signed) EDWARD TROUP."

The council are not satisfied with the present position, and the matter is receiving further attention.

SUBSTITUTION SCHEME AND RETENTION OF MEN.

With a view to releasing further men from tramway undertakings, negotiations have taken place with the War Office in order that every assistance might be given them in connection with the raising of additional men for the army. Through the kind offices of Sir James Hill, Bart., M.P. (Bradford), the Hon. Secretary (Mr. C. J. Spencer) obtained an interview with Lord Derby and discussed the matter. Negotiations were subsequently opened with Major Noel French, and a small deputation of the council afterwards waited upon Major Henderson and another representative at the War Office on December 5, 1916, when details of a substitution scheme were agreed upon.

Under the scheme tramwaymen under 30 years of age and classified as Class "A" men were to be released from tramway undertakings, on the understanding that an equal, or larger number of men, at present in the army, and of low medical category, would be substituted.

Full details of the scheme were circulated among the members.

A considerable number of men of military age and fitness have been released from the various undertakings and substitutes provided.

Since the arrangement with the War Office, the age limit of traffic employees under the certified occupations list has been raised to 31 years in respect of married men, and to 41 for single men.

TRAMWAY SUPPLIES.

In view of the urgency of conservation of material, the Ministry of Munitions approached the Association and other kindred bodies on the question of economy in material on the various undertakings, pointing out that the priority branch would like to feel satisfied that before ordering new material such as cars, rails, tires, etc., every endeavour had first been made to ascertain whether such requirements could not be obtained from—

(*a*) Other tramway undertakings who might have surplus stock, or

(*b*) The Government, who in this connection are holding up material ordered for tramway undertakings abroad.

On January 22, 1917, a joint conference of the Municipal Tramways Association, the Tramways and Light Railways Association, and the Ministry of Munitions (represented by Mr. H. C. Coventry) was held in London.

A list of tramway material, including tires, points, cars, etc., intended for export, was submitted by the Ministry, and it was found that a portion of the items set out on the list would be of use to operators in this country, and arrangements were made for their disposal.

With a view to further assisting the Ministry in economising in respect of supplies, the members of the two associations were circularised and their requirements ascertained, and at the same time they were asked if they had any surplus stock or material for disposal. Lists showing material for disposal and material required have been sent round monthly, and in this way the undertakings have been able to assist each other. Some difficulty has been experienced in obtaining portions of tramcar equipment material, especially steel and malleable iron. Shortage of copper has also been felt in the various undertakings, and at the request of the Ministry a summary of the estimated requirements for maintenance purposes has been supplied, and permits granted for such quantities.

EMPLOYMENT OF WOMEN ON TRAMWAY UNDERTAKINGS.

The number of women employed on tramway undertakings has been greatly augmented during the year, and at the present time women are engaged as drivers, conductors, and cleaners, inspectors, timekeepers, storekeepers, labourers in the repair shops, and on the permanent way gangs, etc. They are also largely employed in filling vacancies on the general office staffs and as cash clerks.

WOMEN DRIVERS IN THE METROPOLITAN AREA.

At the invitation of Mr. J. W. Larke, of the Ministry of Munitions of War, the following attended a conference on February 16, 1917, at 6, Whitehall Gardens, London, to discuss the possibility of training women and ineligible men as tramcar drivers in and around London :—

Mr. J. W. Larke, Ministry of Munitions, in the chair.
Mr. J. Dalrymple, Glasgow Corporation Tramways.
Mr. A. R. Fearnley, Municipal Tramways Association.
Mr. A. de Turckheim, Tramways and Light Railways Association.
Mr. A. V. Mason, South Metropolitan Tramways.
Mr. A. Pott, North Metropolitan Tramways.
Mr. J. K. Bruce, London County Council Tramways.
Supt. Bassom, Public Carriage Department, Metropolitan Police
Mr. Howard Williams, Ministry of Munitions (Railways).
Mr. H. G. Humphreys, Ministry of Munitions.

In response to an enquiry it was found that at that date 16 municipal tramways undertakings were employing women drivers.

Mr. Dalrymple, of Glasgow, stated that they had 220 women driving tramcars in that city, with satisfactory results.

TRAMWAYS IN WAR-TIME.

Considerable assistance has been given by the various undertakings in connection with the transport of material for military purposes and in raising funds for national and other objects.

Valuable aid is also being given to the Government by various members of the Association.

MUNITIONS OF WAR ACTS.—LEAVING CERTIFICATES.

On February 19, 1917, the Ministry of Munitions issued an Order extending the provisions of Section 7 of the Munitions of War Act, 1915, as amended by Section 5 of the Munitions of War (Amendment) Act, 1916, as to leaving certificates to certified tramway undertakings.

INCREASING OF FARES.

The council have had under consideration the question of increasing the statutory fares. A resolution was passed by the Lancashire and Cheshire Tramways urging the Association to take the necessary steps to obtain an increase of statutory fare rates during the continuance of the extraordinary conditions attributable to the war.

Conferences have taken place with the Board of Trade, who have asked to be furnished with further information, and this is being dealt with.

ALTERATIONS TO ARTICLES OF ASSOCIATION.

The report of the council as to the future election of president of the Association having been adopted at the last annual meeting, certain alterations to the Articles of Association were necessary. Resolutions covering these are to be submitted to extraordinary general meetings for confirmation.

ELECTRIC VEHICLE COMMITTEE.

The Association is represented on this committee by Mr. A. R. Fearnley, Sheffield. Numerous meetings have been held during the year, and the report of the committee has already appeared in the technical press.

RAIL CORRUGATION.

No meetings of this committee have been held during the year, and only limited experimental work has been undertaken by the sub-committees due to the abnormal conditions throughout the country and the absence of members on military and Government work.

STANDARDISATION OF OVERHEAD LINE MATERIAL.

The question of standardisation of overhead line material has been under consideration. Due to the varied requirements of the undertakings in the country, the manufacture of the various supplies is carried on under great difficulties, and the Association has been approached by one of the large manufacturers with a view to some action being taken in this direction. The council have appointed the undermentioned committee to consider the advisability of standardising certain parts of the overhead line, and to report to the council thereon :—

SUB-COMMITTEE ON STANDARDISATION OF OVERHEAD LINE MATERIAL.

Mr. L. E. Harvey, tramways manager and engineer, U.D.C. Tramways, Ilford.
Mr. J. F. Simpson, borough electrical engineer and tramways manager, Preston.
Mr. W. Boot, rolling stock superintendent, Nottingham.
Mr. H. Dudgeon, overhead line superintendent, Birmingham.
Mr. W. S. Sturman, overhead line superintendent, Sheffield.
Mr. Weston, overhead line superintendent, Salford.

STANDARDISATION OF TRAMWAY RAILS, TIRES, AXLES, AND SPRINGS.

The sub-committee of the Engineering Standards Committee held a meeting on Tuesday, May 22, 1917, when further details with regard to profile of rail heads, sole plate bolt holes, height of tie-bar holes, position of bond holes, and standard tire profiles were fully dealt with.

The committee afterwards formally approved of the proposed revised sections of Nos. 2 and 4, and new sections 6 and 7, with the corresponding curved section.

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This brings to a close the labours of the committee (extending over three or four years) in regard to designing tramway rails so as to better adapt them to the requirements of present day service.

The committee then proceeded to discuss several matters with regard to the standard specification for tramway rails and fishplates, and the testing of rails.

Motor Omnibus Traffic, Road Maintenance, Etc.

No further action has been taken in this matter, the whole subject being in suspense until after the war.

The attention of members is drawn to the following special legislation which vitally affects municipal tramways :—

Local Government (Emergency Provisions) Act, 1916.

Prohibition of establishment of new routes for omnibuses.

20. (1) Notwithstanding anything in any statute, it shall not be lawful after the passing of this Act for any omnibus to ply for hire on or use any route which has not been regularly used by omnibuses plying for hire within two years prior to the first day of March nineteen hundred and sixteen, except with the consent of the highway authority, or, if more than one, every highway authority liable for the maintenance and repair of the highways along which the route runs, which consent may be given on such conditions as the highway authority may consider fit, or, if in the opinion of the Local Government Board such consent is unreasonably refused, or if such conditions are unreasonable, without the consent of the Local Government Board; and if any person drives an omnibus or allows an omnibus to be driven along any route in contravention of this provision, he shall, on summary conviction, be liable to a fine not exceeding five pounds, and to a further penalty not exceeding forty shillings for every mile travelled by every omnibus in contravention of the provisions of this section, all penalties recoverable under this section to be paid into the funds of the highway authority concerned.

Provided that nothing in this section shall apply where a route is altered in consequence of the temporary diversion of traffic on account of the breaking up of any road or in pursuance of the directions of any police authority or other directions lawfully given.

Provided also that nothing in this section shall apply to any omnibus plying for hire on or using any route in any case where the Admiralty, Army Council, or Minister of Munitions are of opinion that an omnibus service is necessary for and is to be used by munition workers or other persons engaged on Government war service.

(2) This section shall not be deemed to detract from any existing powers of highway authorities in regard to omnibuses.

(3) For the purposes of this section the expression "omnibus" includes every omnibus, char-a-banc, wagonette, brake, stage coach, or other carriage plying for hire or used to carry passengers at separate fares.

It has been noted that certain action is being taken by the County Councils' Association under these powers. The council is watching this, and if anything arises will take steps to safeguard the interests of the Association as far as possible.

Rule of the Footpath.

The question of the rule of the footpath has had consideration by the council.

The following communication was received from Mr. J. Dalrymple, of Glasgow :—

"Glasgow Corporation Tramways,
"17th March, 1917.

"A. R. Fearnley, Esq.,
"Sheffield.

"Dear Sir,

"Rule of the Footpath.

"For some time I have been endeavouring to get the Corporation Watching and Lighting Committee, which has charge of the traffic on the streets, to take up the question as to whether pedestrians on the pavement should keep to the right or to the left.

"The committee were about to put up a large number of additional tablets to ask pedestrians to keep to the right, and at Thursday's Council meeting an amendment was passed sending the whole matter back to the committee for further consideration.

"I am persuaded that pedestrians on the foot pavement should keep to the left instead of to the right, and would like to know whether you have considered this matter and whether the Tramway Authorities could go into the question.

"I think you will agree with me, after looking into the question from a safety point of view, there is no doubt at all that pedestrians on the footpath should keep to the left.

"Yours truly,
"(Signed) Jas. Dalrymple,"
"General Manager."

The members were circularised on the matter, and of the 32 authorities who have dealt with this question 20 expressed themselves in favour of the recommendation for pedestrians to keep to the left.

The subject is to be discussed during the conference, and the council decided to defer consideration of the matter.

Board of Trade Committee on Electrical Supply.

The attention of the council was drawn to the constitution of the Electric Power Supply Committee appointed by the Board of Trade "to consider and report what steps should be taken, whether by legislation or otherwise, to ensure that there shall be an adequate and economical supply of electric power for all classes of consumers in the United Kingdom, particularly industries which depend upon a cheap supply of power for their development."

The committee as originally appointed was as under :—

Electric Power Supply Committee.

Mr. F. Huth Jackson (chairman).
Mr. J. Falconer, M.P.
Sir Charles Parsons.
Sir John Snell.
Sir James Devonshire (Electrical Trades Committee).
Mr. John Kemp, Mr. C. H. Herz } Coal Conservation Sub-committee of the Re-construction Committee.
Mr. J. F. Crowther (Irish interest).
Ald. C. F. Spencer, of Halifax (Local Authorities owning Supply Undertakings).
Mr. G. H. Hume (London County Council).
Mr. A. J. Walter, K.C. (Ministry of Munitions).
Mr. H. H. Law (Local Government Board).
Mr. H. Booth (Board of Trade),

The council felt that the representation of local authorities on the committee was totally inadequate, having regard to the important part played by local authorities in the supply of electrical energy and the extensive character of the capital commitments in relation thereto.

The members were circularised on the matter and resolutions were passed by a number of authorities and forwarded to the Board of Trade, urging upon the President of the Board of Trade the necessity of increased representation being given to them, both in the interests of the ratepayers and consumers of electrical energy.

The Board of Trade subsequently decided to increase the representation of local authorities by appointing the following additional representatives :—

Mr. W. B. Smith, member of Glasgow Town Council.
Mr. Harold Dickinson, City Electrical Engineer, Liverpool.
Mr. E. F. Vesey Knox, K.C., nominated by the Urban District Councils' Association.

As the Municipal Tramways Association is not represented on the committee, the council have communicated further with the Board of Trade.'

Income Tax on Members' Annual Subscriptions.

The Association has been approached by the Inland Revenue authorities to enter into an agreement whereby subscriptions and levies paid by the members of the Association may be allowed as trade expenses in the individual accounts of the members in computing their income tax liability, on certain conditions, including :—

(*a*) That members receiving payments of any kind (other than loans and payments of a capital nature) bring the amounts received to the credit of their individual trading accounts, and that the Association furnish particulars yearly, to December 31, of the amounts paid in that way and to whom paid. In the event of any member or other person refusing to account for the tax on any such receipts in the ordinary course, the amount is to be included in the assessment upon the Association, i.e., by disallowing the items from the expenditure in computing the liability of the Association.

(*b*) That the payment of subscriptions, entrance fees and levies be allowed, and receipts by members from the Association, if any, be credited in the accounts of the individual members for the three preceding years in computing the assessment for the year.

In putting forward the agreement, the Inland Revenue authorities stated that their object was the reduction of labour entailed in dealing with the claims of the individual members.

The council fully considered the matter and decided to enter into the agreement put forward.

Members who pay their own subscriptions will therefore be entitled to include the amount as an expense in their income tax returns.

Vice-Presidency.

Due to the decease of the vice-president, Alderman J. Miles, J.P., a vacancy was created in this position.

The council approached Alderman S. Flint, J.P., chairman of the Leicester Corporation Tramways Committee, on the matter, and are pleased to be able to report that he agreed to accept the position.

Reading of Papers—Annual Conference.

The question of reading papers at the annual conference has had the attention of the council, and the following rule has been adopted :

"That the general rule be adopted that the writer should give a synopsis of his paper, subject to the proviso that if he thinks he cannot give a satisfactory synopsis he be allowed to read the paper in full, with the permission of the president."

The council hope that this will meet with the approval of the members.

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MEETINGS OF MANAGERS' SECTION.

In accordance with the resolution passed at the meeting of the Managers' Section at the last annual conference in London, the council considered this matter early in the year and decided, in view of the extraordinary circumstances still prevailing, to abandon the half-yearly spring meeting.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.—ANNUAL CONGRESS.

The Tramways and Light Railways Association very kindly extended invitations for representatives to attend their annual congress, and the president and secretary attended in that capacity and took part in the discussions.

RESIGNATION OF HONORARY SECRETARY AND TREASURER.

The council regret to report that due to the fact that Mr. C. J. Spencer, who has filled the position of Honorary Secretary and Treasurer for the past 5½ years, has been approached by the Admiralty to undertake certain duties in connection with the shipyard labour scheme, and as his Corporation had agreed to release him in order to enable him to take up his work, he sent in his resignation to the Association. Mr. Spencer kindly offered at the last annual general meeting to undertake the duties during the war, but circumstances had now arisen which rendered it impossible for him to continue in this capacity. The council had therefore no alternative but to accept the resignation, which they did with much regret.

The council requested Mr. A. R. Fearnley, general manager, Sheffield Corporation Tramways, who occupied the position prior to Mr. Spencer, to resume the duties *pro tem.*

FINANCE.

The council have to report that the finances of the Association are in a satisfactory state. The total income amounted to £378 3s. 6d., the balance of income over expenditure for the year being £53 7s. 10d. and the available balance (excluding reserve fund) £281 6s.

By order of the Executive Council,
HENRY MOZLEY, *President.*
A. R. FEARNLEY, *Hon. Secretary* (*pro tem.*)

LUNCHEON BY BLACKPOOL COMMITTEE.

After the annual meeting the members of the conference were entertained at luncheon at the Hotel Metropole on the invitation of the Blackpool Tramways and Electricity Committee. Councillor R. Holt, Deputy-mayor and vice-chairman of the Blackpool Tramways and Electricity Committee, presided. He was supported by several members of the Corporation. After the luncheon,

Mr. HOLT, in welcoming the delegates, said he had to apologise for the absence of the Mayor, who had intended to be present, but who was slightly indisposed. He proposed the toast of the Municipal Tramways Association, and said that the Tramways and Electricity Committee of Blackpool were extremely pleased to receive the Association. The committee hoped the members of the Association would not be long before they came again. After the war was over the committee would try to show them what kind of welcome they could give to the Association. (Hear, hear.) The late Alderman Brodie was one of the original members of the Association, and he was one of the oldest chairmen in point of service of any tramway committee in England. They had electric traction at an early date in Blackpool, and Alderman Brodie was the chairman 17 years ago. There was no one more interested in tramway work.

Mr. MOZLEY said it afforded him great pleasure to respond to the hearty words of the Deputy-mayor's welcome. Mr. Holt had spoken of their old friend, Alderman Brodie, but they ought not to forget their other old friend, John Lancaster. It increased their regret that he could not come and share in the welcome. Both these men were conspicuous for their courtesy and were always helpful in the way of business. He (Mr. Mozley) thanked the town of Blackpool, as represented by the vice-chairman of the Tramways Committee, for the kindly welcome and for the arrangements for the conference being held there. Above all, his own tramways committee, that of Burnley, were very much obliged to Mr. Holt, because it was impossible to provide the accommodation necessary for a conference of this magnitude in a town like Burnley. It was an old bargain between Alderman Brodie and himself that if ever he (Mr. Mozley) had the honour to be president of the Association, Alderman Brodie would arrange that the conference should be held at Blackpool. The outside public should realise that this was an association which represented a great interest in the country. They had 88 municipal authorities members of the Association; they employed 55,000 men in ordinary times; 30,000 of these were now fighting for their king and country (applause), and the allowances for dependants of these fine men, two-thirds of whom had volunteered, amounted to £1,437,000.

Sir JOHN COURTIS proposed the toast of the town of Blackpool, and especially the Tramways and Electricity Committee.

Councillor H. BROOKS (vice-chairman, Blackpool Tramways and Electricity Committee) responded, and in further welcoming the members of the Association mentioned that this had been a record year for the Blackpool tramways.

The members of the conference were afterwards photographed in a group and were then taken by cars to St. Ann's-on-Sea, where they visited the new public gardens and a large open-air swimming bath.

WOMEN TRAMWAY WORKERS' CLUB AT BIRMINGHAM.

An interesting ceremony took place in Birmingham on September 27, on the occasion of the opening by the Lady Mayoress (who was accompanied by the Lord Mayor, Alderman A. D. Brooks) of club rooms in Manchester Buildings provided by the Corporation for the use of the women tramway employees. The visitors, who were entertained to tea by the chairman of the Tramways Committee (Councillor Harrison Barrow), included members of the Tramways Committee, the town clerk (Mr. J. Beaumont Jones), the general manager (Mr. Alfred Baker) and the chief officers of the department, representatives of the conductresses' committee, and the department's two lady welfare workers, Miss L. Keep and Miss E. M. Wayland. Councillor Harrison Barrow drew attention to the considerations which had prompted his committee to provide the rooms. There were now 1,500 women employed, many of whom had been imported into the city, and a large number had to seek lodgings that were more or less uncomfortable. The hours of the girls were irregular, and although they did not ordinarily exceed eight per day, they were spread over 12 or 14 hours. Thus a girl might be required at 5 a.m. for a four-hour turn, and in the evening for another four hours. The problem had been what to do during the remainder of the day. The married women, of course, generally found their spare hours in the middle of the day an advantage in looking after domestic affairs. With single women it was different, and a large number had been obliged either to stop in the mess rooms at the depots or to wander about the streets. It was to

Dining Room of Tramway Workers' Club, Birmingham.

overcome this drawback that the committee had provided the club rooms. No effort had been spared to make the premises attractive and home-like. There was a large room where the girls would be able to meet and obtain suitable refreshments at reasonable prices. Newspapers, periodicals, and games would be provided, and entertainments given. There was a second large room, which would be used principally as a rest and reading room, with easy chairs, couches, etc., and a small library was being formed. It was also felt very desirable that members should be able to sit down quietly to correspond with their friends. The management would be in the hands of a committee of women elected by the employees. Miss Keep and Miss Wayland, two ladies employed to look after the welfare of the women, would act respectively as chairwoman and secretary. The catering would be undertaken by the head office. To ensure the club being run on good lines a panel of 50 girls would be formed. From this panel one or two girls would be selected as responsible officers for the day. It was desirable that the girls should feel that they themselves were taking a good share in the management, and in this way it was hoped that the best results might be obtained. The Lady Mayoress, in declaring the rooms open, paid an eloquent tribute to the accommodation provided, and complimented the women on the way they were endeavouring to carry out men's work. She was glad that it had been realised that women needed different treatment to men, and that the Tramways Committee had taken steps to meet the need. The aim of the committee had been to create a happy family feeling. The best way in which the girls could show their gratitude would be by cultivating this spirit, and by trying to be noble-minded and endeavouring to smooth their personal troubles.

Lighting Relaxations.—While there is now no cause of complaint with the lighting of the streets and public conveyances of the Metropolis, some provincial towns are still endeavouring to secure improvements. Included in the number are Birmingham, Bradford, and Cardiff. A concession in the latter place is the removal of the discolouring from the windows of the tramcars.

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FINANCIAL REPORTS AND MEETINGS.

Madras Electric Tramways have declared an interim dividend on the ordinary shares for the half-year ended June 30 at the rate of 8 per cent per annum.

Dumbarton Burgh and County Tramways Company.—The board announce a dividend of 3½ per cent. on ordinary shares for the past year, transferring £1,673 to the redemption account, £5,000 to the renewal fund, and £2,000 to the reserve, leaving £2,268 to carry forward.

Chloride Electrical Storage Company.—The report for the year ended March 31 last shows, after making provision for depreciation and for the reduction of investments to market value, and for war taxation, a profit of £35,459. Dividends amounting to 10 per cent. have been paid, free of income tax, on the ordinary shares, and the directors now recommend a transfer of £20,750 to reserve fund, making £22,500, and to carry forward the balance of £15,323.

Ayr Corporation Tramways.—Treasurer Ferguson, at a meeting of the Ayr Town Council, mentioned that the tramway undertaking had had a very successful year. The receipts, which amounted to £21,074, were a record for the system, and £1,789 more than those for 1915-16. The working expenses showed an increase of over £1,000. The surplus was £300, as compared with a deficit of £16 in the previous year. The balance at the credit of the depreciation account was £16,249, and the reserve fund stood at £4,932.

Aberdeen Suburban Tramways Company.—At the half-yearly meeting of this company on August 27, Mr. James Mearns, who presided, said that the net profit had slightly increased. There had been a gratifying rise in the revenue, and had it not been for the greatly increased expenses, they would have had a very good half year's business. The credit balance was £3,310, which the directors proposed should be dealt with as follows:—To place at credit of depreciation and renewal account, £1,200, bringing that account up to £17,900; to pay a dividend at the rate of 5 per cent. on the capital, which would absorb £1,561; and directors' fees, £31, leaving a balance of £517 to carry forward. The report was adopted and the directors were voted a further £100 of remuneration.

Tyneside Tramways and Tramroads Company.—Owing to the indisposition of the chairman, Dr. J. T. Merz, the vice-chairman, Mr. J. E. Henderson, presided at the half-yearly meeting of this company held on August 29. After giving a summary of the accounts, a statement of which was included in a previous issue, Mr. Henderson said the increased dividend on the ordinary shares at the rate of 4 per cent. compared with 1¾ per cent. paid previously. An increased amount was placed to reserve, and a larger sum was carried forward. In reply to a letter from a shareholder objecting that a larger dividend was not declared, the chairman said that the times were not normal. Any increased traffic receipts which might be due to decreased railway facilities and increased fares should be considered abnormal, and the directors thought they would better keep a large sum in hand. A proposal to increase the remuneration of the directors, which had stood at £175 per annum since February, 1903, to £300 per annum, was adopted. A resolution authorising the directors to make a contribution of ten guineas to the Royal Infirmary, and to expend a sum not exceeding £200 on war charities in the half-year was also carried.

Walter Scott, Limited.—At the annual meeting of the shareholders of Walter Scott, Limited, in Newcastle on August 29, Sir William Stephenson, who presided, moved the adoption of the directors' report, which showed profits of £127,000 and recommended a dividend of 15 per cent. He said that the company's steel works had remained "controlled," and the difficulties of working had been accentuated by the appointment of a Coal Controller, but the year was, perhaps, taken all round, the best since the company was formed 17 years ago. The steel works at Leeds had been fully employed, and while the output had not quite reached that of the previous year, the receipts had increased by over £200,000, although prices had been largely controlled by the Ministry of Munitions. After meeting extra costs and providing for taxation, they had been able to lay aside a large sum to meet future contingencies. They were now wholly engaged on Government work, and had a big order book, which would keep them fully employed for many months. With regard to the collieries, despite the demands for men for the army, the output increased by the same amount as it was down in 1915-16—25,000 tons—and the receipts increased considerably, while they had remunerative contracts for many months ahead.

PERSONAL.

Mr. J. C. Whiteley, general manager and engineer of South Shields Corporation Tramways, has been granted an increase in salary of £100 per annum.

Mr. C. W. Mallins, general manager of the Liverpool Corporation Tramways, has been granted an increase in salary from £1,250 to £1,500 per annum.

Dundee Town Council has granted a war bonus of 7½ per cent. on the salaries of the burgh engineer, the water engineer, and the tramways manager.

Mr. R. S. Pilcher, general manager of Aberdeen Corporation Tramways, has been granted an increase in salary of £100, in two yearly instalments of £50.

Mr. R. Collins, of the Belfast staff of the Edison-Swan Electric Company, has been appointed engineer and manager of the Galway Electric Supply Company.

Mr. Thomas Copp, permanent way foreman for the Peterborough Electric Traction Company, has been appointed permanent way inspector of the Cape Town Tramways.

Mr. F. H. Rudd has been appointed chief engineer of Rochdale Corporation Electricity Department at a salary of £400, increasing by two annual increments of £50 each to £500.

Messrs. Kincaid, Waller, Manville, and Dawson have removed their offices to 3, Central Buildings, Westminster, S.W.1; St. Stephen's House, their previous address, having been requisitioned by the Government.

Mr. J. Wilkinson, tramway electrical engineer, Hull, has returned to business after a serious illness of several weeks' duration, and will be glad if his business friends will note his new address, Tramway Power Station Buildings, Osborne Street, Hull.

Mr. R. Birkett, borough electrical engineer and tramways manager of Southend-on-Sea, has been requested to serve temporarily with the Coal Control Board, but owing to the depletion of their staff, the Council found it impossible to grant Mr. Birkett leave of absence.

Mr. G. Webster, general manager of Rochdale Corporation Tramways, has been recommended by the Tramways Committee to receive an increase in his salary from £450 to £500 a year. Warm appreciation of Mr. Webster's services was expressed by several members.

Mr. R. R. Greene, tramway manager of Wallasey Corporation Tramways, has been granted an increase in salary from £550 to £650 by four annual instalments of £25 each. The same increase, also by four instalments, was granted to **Mr. J. H. Crowther,** the electrical engineer, whose present salary is also £550.

Mr. W. G. T. Goodman, chief engineer and general manager of the Adelaide Municipal Tramways Trust, recently arrived in London after spending some time in the United States. The voyage from New York occupied three weeks, and provided some interesting experiences. Mr. Goodman is president of the Tramway Officials Association of Australia, and just before leaving Adelaide he was elected president of the Federal Council of the Australian Electrical Association.

Mr. John Wardle, commercial manager of the Metropolitan Railway, has been appointed by Lord Rhondda to control cold storage and inland transport of food. Mr. Wardle studied the methods of the great American meat chilling companies during his visits to the United States. He commenced his railway career with the Lancashire and Yorkshire Railway in Manchester, and during ten years gained a large experience in railway and dock work. He then left Britain to take up a position with the Grand Trunk Railway of Canada. Returning to Britain, he became London traffic manager of the same railway, and in 1908 joined the Metropolitan Railway.

Mr. George Salter, chairman of George Salter and Company, Limited, died on August 31, at Stourbridge, at the age of 61 years.

The late Mr. W. S. Laycock, of Oakbrook, Fulwell, Sheffield, head of the firms of W. S. Laycock, Limited, and Cravens, Limited, Sheffield, manufacturers of railway material, left estate valued at £71,145.

Will of Sir George White.—Probate of the will of the late Sir George White, Bart., late chairman of Bristol Tramways and Carriage Company, and founder of the first aeroplane factory in this country, has been granted to his only son, Sir Stanley White, Bart. The will, which is dated July 15, 1916, provides for the division of the whole of the deceased's unsettled property in certain proportions between his son and only daughter, Mrs. Ernest J. Hudson. Probate has been taken out upon a gross sum (exclusive of the value of property settled or transferred in the lifetime of the deceased) of £185,000, with net personalty of £137,000.

Alderman John Miles's death during the first week in September, occasioned great regret on the part of the Mayor and Corporation and townspeople of Bolton. The expressions of grief and condolence were equally marked at the annual conference of the Municipal Tramways Association, for last year Alderman Miles was elected vice-president, and would this year have been elected to fill the office of president. In moving his election as vice-president, Mr. Holford (general manager, Salford), remarked that he did not know a more courteous gentleman. He was always willing to do anything for tramways in connection with the Association and with the work of the Lancashire Association. In acknowledging his unanimous election, Alderman Miles said he took a very warm interest in the Association, and in his humble way he had also tried to do the best he could for his own town, which he loved so well. Alderman Miles was the "father" of Bolton Corporation, which he entered in 1874, and was twice mayor. He had been a member of the tramways committee from its formation in 1899, and for many years he had acted as chairman.

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WITH THE FORCES.

Mr. J. S. Green, son of the borough surveyor of Haslingden, has been gazetted second lieutenant in the Royal Engineers.

Signaller Sergeant F. Hall, formerly in the employment of the Blackpool, St. Annes, and Lytham Tramways Company, is in hospital in France suffering from shrapnel wounds.

Lieutenant-Colonel G. G. Ewer, of the Essex Regiment, who has been awarded the D.S.O., was sales manager of the Stepney Council's Electricity Department. He is serving in Palestine.

Company-Sergeant-Major R. Edwards, York and Lancaster Regiment, who was a driver on the Rotherham Corporation tramcars, has been promoted to be Regimental-Sergeant-Major.

Lieutenant E. Ivor David has been appointed Captain in the R.F.C. (Equipment Department). Captain David was formerly manager of the British Thomson-Houston Company in South Wales.

Sapper J. E. West, West Lancashire R.E., and late of the United Electric Car Company's Works, has been awarded the Military Medal for bravery and devotion to duty. He enlisted in October, 1914.

Sapper J. Gimmell, R.E., who has been awarded the Military Medal for meritorious work performed under heavy shell fire, was formerly employed as a motorman on the Glasgow Corporation Tramways.

Lance-Corporal E. T. Moore, Royal Welsh Fusiliers, who before joining the army was in the employment of Cardiff Tramways, has been presented by the tramway employees with a gold watch and chain to commemorate the third award of the Military Medal to a Cardiff tramwayman. Mrs. Moore was the recipient of a gold chain and locket.

Corporal Francis Archie Hirst, R.F.A., has been awarded the D.C.M. for exceptional bravery on the battlefield in Flanders and volunteering for special observation work at great personal risk. Corporal Hirst was formerly an electrician in the Blackpool Corporation Tramways Department, and joined the signalling section of the West Lancashire Territorial R.F.A. in November, 1914.

Private Tom Witham, Coldstream Guards, who has won the Victoria Cross, was formerly in the service of the Burnley Corporation Tramways. His wife has received a letter from Mr. H. Mozley, general manager, in which he says:—"I cannot refrain from offering my congratulations to your husband upon his splendid services in the war, which are being acknowledged by the King in granting him the V.C., an honour which means so much, not only to the winner, but to those who are associated with him. Although he was not very long in our service before he volunteered for the war, we feel that a little of the glory he has won is reflected upon the tramway staff, and all of us are heartily proud of what he has done. Kindly give him my heartiest congratulations."

A Patriotic Family.—Captain Walter Courtis, R.E., youngest son of Major Sir John Courtis, chairman of Cardiff Tramways Committee, has been wounded in France, and is now in hospital in that country. The wound is in the left elbow, and is not serious. Prior to the war, Captain Courtis was an officer in the Glamorgan Fortress Royal Engineers. He has seen service in the East, and when at Sinai he volunteered to fill a vacancy in the East Lancashire Engineers, and was drafted to France early in the present year. The eldest son, Captain J. H. Courtis, Oxford and Bucks Light Infantry, was killed in the advance on Bagdad in November, 1915. The other son is Dr. A. O. Courtis, who has been a surgeon in the Royal Navy for over two years. Miss Courtis is doing war work in France, where the youngest daughter is also engaged as a motor ambulance driver. Sir John Courtis has organised the Cardiff and district section of Welsh Motor Volunteer Corps, in which he holds the rank of major.

CONTRACTS AND ORDERS.

Hadfields, Limited, have accepted a contract to supply special trackwork to Manchester Corporation Tramways.

Babcock and Wilcox, Limited, have an order from Manchester Corporation for superheater tubes for Bloom Street Electricity Works.

Messrs. Frederick Smith and Company, of Halifax, have received an order for the supply of trolley wire to Glasgow Tramways Committee.

Victoria Railways Department have placed a contract with Noyes Brothers, Melbourne, for vulcanised rubber electric light wire at £17 17s. 6d. per mile.

P. R. Baillie and Company have a contract to supply 100 miles of rubber-insulated wire, at £2,800, to the New Zealand Public Service Stores Tenders Board.

The British Westinghouse Electric and Manufacturing Company are to supply a 300-kw. rotary converter set to Salford Corporation at £1,535, and switchgear at £551.

Siemens Brothers and Company, Woolwich, have a contract to supply feeder cable and feeder pillars, etc., to Kettering Council, at £1,737. There were eight tenders.

Accrington Electricity and Tramway Committee have placed an order with George Hargreaves and Company for 500 tons of coal per month for a year at existing prices, subject to any alteration made by the Coal Controller.

Ilford Council have accepted the following tenders:—Two rotary converters, General Electric Company; 4,400 yards of 6,600 volt cable, W. T. Henley's Telegraph Works; 3,600 yards of two-way stoneware conduit, Albion Clay Company.

Ilford Council have accepted the following tenders:—General Electric Company, Limited, converting plant, £2,459; W. T. Henley's Telegraph Works Company, Limited, cables, £1,432; Albion Clay Company, Limited, conduits, £526.

Manchester Electricity Committee has accepted tenders from Callender's Cable and Construction Company, Limited, W. T. Henley's Telegraph Works Company, Limited, C. Macintosh and Company, Limited, and the British Insulated and Helsby Cables, Limited, for the supply of cable.

Contractors' Increased Costs.—Glasgow Electricity Committee have advised the Corporation to allow an additional sum of £5,000 to Messrs. Babcock and Wilcox, Limited, on their contract price of £24,000 for providing and erecting a coal conveyor and transporter at the Dalmarnock generating station. The addition is to provide for the increased cost of labour and materials.

Wolverhampton Council have allotted the following contracts:—Messrs. Alley and McLellan, valves for pumping plant, £226; Rees-Roturbo Manufacturing Company, Limited, two motor-driven pumps, £384; Electric Construction Company, Limited, motors for new plant, £1,272; Film Cooling Towers, Limited, cooling towers, £5,444; J. Spencer, Limited, steam feed water pipes, £280.

New Glasgow Generating Station.—The Electricity Committee have recommended the acceptance of the appended tenders:—Reinforced concrete superstructure for a boiler house, turbine room, and workshop at the new Dalmarnock station, Messrs. Train and Taylor, £64,539; eight boilers, stokers with forced and induced draught, economisers, etc., Babcock and Wilcox, Limited, £140,282; 12 sets of switch gear, A. Reyrolle and Company, Limited, £33,985; 27 panels of additional switchgear at sub-stations, A. Reyrolle and Company, Limited, £14,210.

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRKENHEAD.

HALFPENNY FARES DEFINITELY ABANDONED.

Birkenhead Council have rejected a motion by Alderman Byrne rescinding the recent increase of fares and instituting penny return tickets for the halfpenny stages recently abolished. Councillor Halsall, chairman of the Tramways Committee, mentioned that since the abolition of halfpenny and three-halfpenny fares the receipts had been the highest on record. Many towns had increased their fares, and others were applying for power to charge beyond the statutory limit of one penny per mile. The charges in Birkenhead were nothing near a penny a mile, and with regard to the halfpenny fares, if they lost them all it would only be equal to 1 per cent. of the total receipts. The committee had to face heavy expenditure, which would increase as they went on.

COVENTRY.

INCREASED WAGES AND COSTS—DIMINISHING LABOUR SUPPLY.

The Council have granted the tramway employees an increase of a halfpenny an hour as from April 1 last. Councillor Wale, vice-chairman of the Tramways Committee, speaking at a recent Council meeting with reference to fares, said that they aimed at providing a service at fares as near cost as possible. They had to have regard to the department paying its way, and he emphasised the fact that wages and the cost of material had very greatly increased, with the result that the gross profits were steadily diminishing. The committee had passed resolutions to the effect that they had not sufficient men to give the service they would like, and that the increased cost must be passed on to the public. The recruiting authorities appeared to look upon a tramway concern as a milch cow for providing recruits, and owing to increasing scarcity of labour there was a probability of the Sunday services being discontinued.

DOVER.

REDUCTION OF SERVICES.

The tramway service is to be reduced owing to the difficulty of obtaining drivers. Following the recent accident the committee have approved a recommendation of the coroner's jury to license tramway cars and drivers, and give to the police power to prevent overcrowding.

DUNDEE.

THE RULE OF THE FOOTPATH.

The Dundee Tramways Committee have decided to support the movement in favour of a change in the rule of the footpath requiring pedestrians to "keep to the left." Mr. Fisher, the tramways manager, stated that the present rule of "keep to the right" had resulted in numerous accidents.

GLASGOW.

INCREASING EMPLOYMENT OF WOMEN.

The latest figures issued as to the employment of women by Glasgow Corporation Tramways show that out of a total of about 5,600 employees 2,500 are women. Of these, 1,360 are conductors

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and 400 are drivers. In the power-station there are five female switchboard attendants. Eight women are employed in a like capacity in sub-stations, one sub-station being entirely staffed by women. Six inspectors of street switchboxes are women, while in the depots there are 490 female cleaners.

LEICESTER.

REVISED FARES—PUBLICATION OF TRAFFIC RETURNS RESUMED.

The revised fares came into force on the Corporation tramways on August 20. In addition to the ordinary fares (introducing halfpenny stages on the outer portions of the routes) there will be a certain number of special fares, which are shown as follows :—Early return tickets, full distance (1½d. stage), 2d.; early return tickets, for any 1d. stage, 1½d.; outer transfer tickets, for any outer transfer stage, 2d.; inner transfer tickets, no alteration, 1½d.; children's tickets, no alteration, any 1½d. stage, 1d.; children's tickets, on halfpenny stages, same as adults, ½d.; soldiers' tickets. non-commissioned officers and men, no alteration, any 1½d. stage, ½d.; commissioned officers, ordinary fare. Outer return tickets are abolished. An experiment is being made in halfpenny fares on the outer zones only, the distance allowed being half a mile. The Tramways Committee have resumed the publication of the weekly traffic returns, so that ratepayers will be enabled to form their own opinion of the success of the new fares.

NOTTINGHAM.

EFFICIENT LIFEGUARDS.

At an inquiry into the death of a child who was killed by falling in front of a tramcar at Nottingham, it was stated that 15 people and several dogs had been picked up by the lifeguards in Nottingham in the last twelve months. The evidence showed that the driver had no chance to release the guard before reaching the child, who ran straight on to the track and fell head foremost in front of the car. The coroner's jury returned a verdict of accidental death, and exonerated the driver from all blame.

ROSSENDALE.

DEMAND FOR WAR BONUS FOR WOMEN AND BOYS.

About 100 employees of the Rawtenstall Corporation Tramways Department struck work on September 2 to enforce a demand that women and boys, like the men, should be paid a war bonus of 4s. per week, to date from July 1. The offer of the Corporation to women and youths was 2s. 6s. a week. The stoppage of the tramway service affected Bacup and neighbouring places, and special inconvenience was caused on September 3, which was a Rossendale holiday. On September 5 the strikers agreed to return to work on the understanding that their application would be considered by the Corporation.

SOUTHAMPTON.

TRAMWAY EMPLOYEES AS GARDENERS.

The members of the Southampton Corporation Tramways Athletic and Social Club have devoted much time to the cultivation of gardens and allotments during this summer, and recently a show was held at the Portswood depot, at which there was a fine display of vegetables. This was the first event of the kind organised by the club, but it was thoroughly successful, and it is hoped that a similar show will be held each year. The movement was originated in order to encourage the many allotment holders among the tramway men, and the exhibits proved that the object had been fully attained. There were nearly 250 entries, and at the prize giving in the evening speeches were made by Alderman Dunsford, Mrs. Dunsford, Alderman Dacombe, Mr. W. T. Robson, the tramway manager, and others, in which warm appreciation was expressed of the good feeling existing between the employees and the management and committee. Many of the allotments cultivated by the exhibitors were originally dumping grounds for all kinds of rubbish, and the excellent result obtained is a striking testimony to the industry and persistence of the amateur gardeners. Provision was made for the encouragement of women conductors and boys, and it is interesting to note that one of the vegetable prize winners was a girl conductor, who had very successfully cultivated an allotment single-handed.

WALLASEY.

A ONE-DAY STRIKE CAUSED BY FEAR OF WOMEN LABOUR.

The Wallasey Tramways Committee disagreed recently as to the advisability of employing women as drivers, and the Council gave a direct instruction that a few women should be trained and employed experimentally. When the manager attempted to carry out the instruction, a strike was threatened. It was pointed out to the men that the strike would be illegal under the Munitions of War Act, twenty-one days' notice being necessary to the Board of Trade, and even then if there was official intervention it would not be allowable for the men to carry out their threat. Colonel R. R. Greene, the tramways manager, attended a meeting of the employees, and explained that the resolution of the Council would have to be carried into effect, but although a few women were being trained, there was no intention of displacing men by the employment of woman labour. The employees nevertheless came out on strike, but returned to work on the following day on the understanding that the committee would give immediate attention to their grievances.

MANCHESTER TRAMWAYS AND RATE RELIEF.

MANAGER'S RECOMMENDATION FOR INCREASED FARES.

In a special report presented to Manchester Tramways Committee by Mr. J. M. McElroy, the general manager, it is stated that the estimates on revenue account, prepared in April for the current financial year, showed, after meeting working expenses and fixed charges (but without provision for renewals), that a balance of £103,366 would be available. This sum the committee proposed to apportion as follows :—Renewals fund, £53,366 ; relief of rates, £50,000. In proposing to reduce the payment to the city fund from £100,000 to £50,000, the committee were satisfied that they were adopting a sound policy. When the estimates were before the Council a resolution was adopted that £100,000 should be contributed in relief of rates, and provision will therefore have to be made accordingly.

The revenue account from April 1 to June 30 last shows an increased income of £17,341, but the expenses are increasing as fast as the income. The net revenue shows an increase of £1,046 only. There will be a tendency for expenses to increase at a greater rate than income, and in the light of the figures now before him Mr. McElroy anticipates that at the end of the year, after making provision for payment of the £100,000 in relief of rates, there will be nothing available for the renewals fund. Indeed, there is a probability that there will be a deficiency.

Mr. McElroy adds that in previous reports he has pointed out the enormous drain which the war service allowances, war bonuses, etc., have been upon the financial resources of the undertaking. At the end of the current year the total amount which will have been paid under these heads since the outbreak of war will be about £350,000. The department has only been able to meet these payments by decreasing the amounts paid into the renewals fund. The total decreased provision up to the end of the current financial year will amount to £278,769. The renewals fund (less depreciation on investments) now stands at £320,528. This will be decreased during the year by payments for renewal purposes, and if there is a deficiency in the revenue account at the end of the year it will have to be made good by a transfer from the renewals fund. The renewals fund, as it now stands, is far from adequate. Immediately after the war a large amount of track renewals will be necessary, and in view of the high prices of materials the drain upon the fund will be very large.

The situation, the general manager says, is therefore serious, and demands prompt action on the part of the committee. The only possible action lies in the direction of increasing the fares—a course which Mr. McElroy recommends the committee to adopt.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

APPLICATIONS FOR LETTERS PATENT.

Fare-ticket systems and devices, etc. (12,567)—W. Aitken.

Trolley wheels (12,412)—A. E. Alexander (*Ollard Trolley Wheel Company*).

Compensating driving mechanism for motor vehicles (12,411)—J. D. Allen.

Brake blocks and linings, clutch linings, etc. (12,310)—H. Frood.

Substitute for petrol for motive power (12,530)—H. Iredell.

Storage systems for supply of gas to internal combustion engines (12,542)—London General Omnibus Company.

Means of manipulating trolley poles of electric vehicles (12,819)—J. L. Carr.

Motor vehicles (12,639)—L. S. Girling.

Apparatus for storing coal gas, etc., for use in motor vehicles (12,722)—G. P. Ottino.

Tram rail (12,743)—W. H. Puttergill.

Electro-pneumatic braking systems (12,724 and 12,727)—W. V. Turner.

Fluid-pressure braking apparatus (12,725 and 12,726)—W. V. Turner.

Lifeguards for tramway, etc., vehicles (12,759)—H. Worsnop, J. Worsnop, and M. Worsnop.

Devices for preventing creeping of rails (13,222)—Akt.-Ges. der Eisen-und Stahlwerke vorm. G. Fischer.

Anti-friction rail wheels (13,134)—H. N. Barnes and E. Pollard and Company.

Gas containers for motor vehicle propulsion (13,232)—G. E. Duerden.

Gas containers for motor vehicles (13,229)—R. C. Jagger.

Supporting and carrying gas bags or containers for motor vehicles (13,161)—A. Moore and J. D. Tomlinson.

Transmission gear for self-propelled vehicles (13,121)—G. R. Rankine.

Overhead trollies for electric tramway or railway vehicles (13,057)—E. Spencer.

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In the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).
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Portable gasometer for use with motor vehicles (13,001)—F. Spivey.
Means for storing and supplying gas for motor vehicles (13,518)—H. and W. Broughton.
Trolley-wire systems for electric railways, tramways, etc. (13,551)—P. Dawson and F. W. Fawdry.
Electric tramway trolley wire finder and trolley wheel adjuster (13,358)—D. A. Halpin and R. Lancaster.
Collapsible gas holders for motor vehicles (13,641)—J. C. Jolly and United Automobile Services, Limited.
Motor vehicles (13,489)—London and Westminster Industrial Syndicate and H. B. Molesworth.
Gas equipments for motor vehicles (13,642)—R. Oldham and Whitehouse and Oldham.
Sleepers for railways, etc. (13,530)—E. A. W. Phillips.
Control of transmission mechanism for heavy mechanically-propelled vehicles (13,611)—W. G. Wilson.
Heavy mechanically-propelled road vehicles (13,612)—W. G. Wilson.
Gas containers for motor vehicles (13,269)—H. O. Worrall.
Liquid fuel feeding devices for motor vehicles (13,702)—T. Blakey.
Automatic folders for gas containers on gas-driven vehicles (14,101)—G. and W. Chapman.
Supporting device for overhead electric trolley wires (13,726)—P. Dawson, F. W. Fawdry, and H. W. H. Richards.
Method of imparting elasticity to railway sleepers of reinforced concrete (13,711)—A. Wood-Hill.
Elevated railways, tramways, etc. (14,017)—S. A. Rogers.
Electrical transmission arrangements for motor vehicles, etc. (13,741)—J. Sankey and Sons and W. A. Stevens.

Specifications Published.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application number should, however, still be used for correspondence purposes.

Steering mechanism for motor vehicles (13,570—*108,389*)—G. C. Hayes and C. C. D. Steele.
Reinforced concrete railway sleepers and means for fixing rails and chairs thereto (15,143—*102,050*)—L. Pelnard-Considere.
Tires (10,575—*109,070*)—Dunlop Rubber Company and C. Macbeth.
Tires (12,155—*109,082*)—J. H. Christian.
Trolley poles for electric cars (12,316—*109,098*)—T. Warsop.
Motor road vehicles (14,934—*109,139*)—H. U. Diplock.
Motor vehicles (16,019—*108,970*)—Daimler Company and F. W. Lanchester.

1917.

Regenerative braking systems (2,872—*105,225*)—W. V. Turner.
Lifting jacks for use on motor road vehicles (4,182—*108,822*)—F. L. Rapson.
Securing flanged railway rails to metal sleepers (6,540—*108,834*)—W. H. Ashmore.
Rail joints (5,131—*809,222*)—J. Zahuranec.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.		1916. WEEKS ENDED.					1917. WEEKS ENDED.					AGGREGATE.		
		Sept. 2.	Sept. 9.	Sept. 16.	Sept. 23.	Sept. 30.	Sept. 1.	Sept. 8.	Sept. 15.	Sept. 22.	Sept. 29.	Wks.	1917.	Increase or Decrease.
		£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		47.933	52.818	51.992	50.087	50.947	50.116	53.759	53.807	53.200	53.126	39	2.002.660	+ 24.827
Auckland		...	...	(28 days)	20.884	...	...	...	(28 days)	22.154	...	12	64.876	+ 2.018
Calcutta	Rs.	65.007	72.433	73.566	69.737	72.605	69.550	71.115	72.540	70.885	72.180	39	2.662.235	+ 22.369
Madras	Rs.	34.066	(2 weeks)	34.552	(2 weeks)	31.788	38.031	(2 weeks)	36.217	(2 weeks)	34.219	39	624.412	+ 54.626
Pernambuco		3,148	3.437	3.181	3.147	3.094	4.013	3,804	3,787	3,845	4,061	38	146.072	+ 28.504

Companies Issuing Monthly Statements.

		1916.						1917.						Wks.	AGGREGATE.	
		April.	May.	June.	July.	August.	Sept.	April.	May.	June.	July.	August.	Sept.		1917.	+ or −.
		£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo		3.727	3.854	2.794	2.704	...	...	4.611	2.991	2.849	2.593	...	...	16	13.044	− 35
Brazilian Traction Mlrs		6882000	7304000	7178000	7429000	7405000	...	7453000	7864000	7642000	7795000	8064000	...	34	60.505.000	+4.492.000
Brisbane		32.575	33.150	31.390	32.880	37.900	32,530	31.620	33.340	32.475	32.720	36.925	31,600	39	294.840	− 2.820
British Columbia	$	421.265	414.215	400.814	411.847	423.738	...	447.429	438.919	373.029	438.378	454.425	...	8	892.803	+ 57.218
Buenos Ayres Lacroze		40.220	40.220	36.213	38.439	36.431	...	39.111	40.595	38.020	38.063	39.111	...	8	77.174	+ 2.304
Burma		22.191	23,585	24,027	26.340	24.413	...	23.660	24.906	25,463	26.288	26.714	...	4	26.714	+ 2.301
Cape Town		...	...	...	...	...	...	16.705	15.867	...	16.067	15.480	...	8	31.547	+ 4.796
Carthagena & Herrerias		2.513	2.927	3.512	2.371	2.081	1.779	4.366	4.321	5.325	5.763	4.164	4.306	39	38.405	+ 15.805
Cordoba		...	14.869	14.120	14.258	...	...	...	13.735	14.416	14.343	...	...	18	56.154	− 1.165
East India		2.116	2.161	2.283	2.220	2.522	2.523	1.445	1.455	1.186	1.183	1,562	1.512	9	3.074	− 1.971
Kalgoorlie		2.553	2.921	2.500	...	...	...	2.705	2.692	2.648	...	...	...	26	15.441	+ 504
La Plata		4.354	4.342	3.735	3.910	3.793	3.993	4.229	4.126	3.852	3.875	4.076	3.450	39	36.545	− 1.076
Lima		33.542	33.966	...	...	...	...	37.807	35.321	...	...	...	...	21	181.809	+ 13.098
Manaos	Rs.	155.030	152.854	144.913	152.380	...	...	160.545	158.613	165.693	162.157	...	...	—	—	—
Manila	$	...	53.900	59.432	...	...	...	...	61.500	73.900	...	...	...	—	—	—
Mexico	$	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video		28.997	28.349	25.300	25.220	26.044	26.711	29.230	28.716	27.458	28.597	28.860	29.426	48	329.679	+ 10.636
Peruvian	$	...	826.900	929.500	835.430	895.900	911.910	...	902.780	965.420	975.000	979.430	950.740	13	2.905.170	+ 261.930
Port Elizabeth		...	...	...	3.166	2.863	...	3.904	3.494	...	3.544	3.360	...	8	6.904	+ 875
Rangoon		4.849	4.589	4.205	4.357	4.253	4.137	5.036	4.737	4.383	4.783	4.788	5.163	39	44.354	+ 3.026
Toronto	$	883.209	903.924	884.491	867.789	889.241	...	970.367	992.460	984.529	954.192	1039819	...	34	7.867.595	+ 775.366
Winnipeg	$	282.498	276.980	254.686	242.688	249.795	...	265.594	259.794	254.226	242.797	248.457	...	34	2,164.624	− 29.333

(*Continued on page 276*)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1916. WEEKS ENDED.					1917. WEEKS ENDED.					AGGREGATE.		
	Sept. 2.	Sept. 9.	Sept. 16.	Sept. 23.	Sept. 30.	Sept. 1.	Sept. 8.	Sept. 15.	Sept. 22.	Sept. 29	Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	411	407	407	407	430	423	435	449	456	441	25	11.210	+ 1.025
Aberdeen Corporation	2.005	2.252	2.041	1.854	2.025	2.206	2.401	2.205	2.178	2.216	17	38.190	+ 4.433
Accrington Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Ayr Corporation	638	575	474	376	438	535	456	447	421	526	20	11.629	+ 918
Bath Electric	*	...	...	...	...	...	...	...	...	...	—	—	—
Belfast City	5.840	5.844	5.882	5.588	5.883	6.330	6.820	6.928	6.730	6.609	26	163.349	+ 15.774
Birkenhead Corporation	1.617	1.577	1.555	1.610	1.671	1.897	2.263	2.003	1.903	1.982	26½	48.471	+ 7.490
Birmingham Corporation	16.789	16.855	16.700	16.388	18.117	18.099	19.109	19.153	19.206	19.429	26	470.497	+ 36 147
Birmingham Corp. Motor Omnibuses	1.001	1.043	979	960	1.078	1.023	1.211	1.213	1.187	1.204	26	26.218	— 118
Blackburn Corporation	1.305	1.323	1.417	1.375	1.385	1.392	1.521	1.778	1.788	1.493	26½	40.836	+ 5.916
Blackpool and Fleetwood	2.352	2.247	1.631	1.268	...	1.939	2.299	1.686	1.535	...	37	36.324	— 128
Blackpool Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Bolton Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Bournemouth Corporation	3.108	2.998	2.619	2.431	2.337	3.449	3.366	2.825	2.985	2.973	26½	71.648	+ 4.778
Bradford Corporation	8.136	7.045	7.497	6.572	7.078	7.446	8.396	8.032	7.603	7.940	26	202.664	+ 18.091
Brighton Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Bristol	5.431	5.372	5.405	5.162	5.419	5.664	6.377	6.134	6.170	6.123	39	211.363	+ 19.403
Burnley Corporation	1.818	2.008	1.850	1.738	1.765	1.750	2.221	2 224	1.927	1.966	...	—	—
Burton-on-Trent Corporation	302	295	287	290	293	341	327	326	340	329	26	8.046	+ 734
Bury Corporation	1.491	1.579	1.449	1.533	1.726	1,568	1.977	1.736	1.683	1.738	26½	44.839	+ 5 291
Cardiff Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Chatham and District	1,486	1.410	1.420	1.378	1.381	1.429	1.530	1.429	1.395	1.299	39	50.872	+ 2.687
Chesterfield Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Colne Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Cork Electric	557	598	583	527	542	577	636	626	611	598	39	21.362	— 1.377
Croydon Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Derby Corporation	1.211	1.185	1.142	1.120	1.163	1.251	1.272	1.245	1.254	1.259	26	31.667	+ 1.158
Dover Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Dublin and Lucan	*	...	...	...	...	...	...	...	...	...	—	—	—
Dublin United	6.831	6.739	6.803	6.269	6.682	6.790	7.393	7.269	7.368	7.040	39	260.814	+ 25.530
Dundee City	1.458	1.493	1.639	1.387	1.393	1.625	1.696	1.512	1.598	1.576	19½	30.192	+ 2.736
East Ham Corporation	1.322	1.329	1.335	1.314	1.398	1.484	1.480	1.471	1.497	1.324	26	37.569	+ 2.562
Exeter Corporation	478	472	454	439	445	436	469	453	447	433	26	10.860	— 33
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	23.552	23 809	24.085	23.450	24.543	26.153	27.170	27.615	27.124	27.394	17½	458.164	+ 54.059
Glossop (Urban Elec. Supply Co.)	153	153	151	150	162	171	187	186	183	178	39	5.913	+ 495
Halifax Corporation	2.702	2.545	2.412	2.192	2.341	2.474	2.757	2.817	2.558	2.431	25½	65.962	+ 5.019
Halifax Corp. Motor Omnibuses	52	53	52	51	52	51	52	55	54	54	25½	1.239	— 66
Hastings and District	1.646	1.734	1.552	1.329	1.267	1.791	1.956	1.819	1.553	1.609	39	49.702	+ 7.387
Huddersfield Corporation	3.015	3.569	2.849	2.805	3.117	3.131	4.578	3.219	3.210	3 450	26	87.403	+ 7.827
Hull Corporation	3.168	3.067	3.106	3.028	2.979	3.543	3.566	3.483	3.547	3 559	26	88.862	+ 6.652
Ilford U.D. Council	680	697	695	682	689	817	838	809	835	739	26	20.578	— 2.164
Ilkeston Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Ipswich Corporation	595	560	560	518	561	817	860	793	787	726	26	18.718	+ 4.038
Isle of Thanet	797	752	642	494	436	469	448	373	309	240	52	16.317	— 3 459
Kilmarnock Corporation	184	182	182	177	181	201	217	205	204	207	19½	3 871	+ 326
Lanarkshire	2.442	2.500	2.586	2.491	2.659	2.994	3.007	3.066	3.124	3.177	39	107.118	+ 16 840
Lancashire United	2.014	2.205	2.020	1.898	2.189	2.579	3.152	2.966	2.605	2.335	39	90.910	+ 20.075
Leeds City	10.534	10.075	9.823	9.990	10.310	10.767	11.790	11.579	11.232	11.326	26	290.088	+ 29.329
Leicester Corporation	...	...	3.396	3.370	3.794	...	...	3.937	4.011	3.941	—	—	—
Leith Corporation	932	913	914	855	909	1.055	1.119	1.129	1.131	1.113	19½	21.604	+ 3.820
Leyton U.D. Council	1.732	1.771	1.787	1.771	1.889	1.964	2.032	1.927	1.996	1.900	26	50 448	+ 5 228
Liverpool Corporation	14.964	14.662	14.367	14.219	15.079	15.884	16.920	16.757	16.369	16 290	38½	601.540	— 53.155
Llandudno and Colwyn Bay	836	781	636	546	460	739	723	610	560	450	43½	15.603	— 971
London County Council	49.502	49.247	49.461	49,349	51.640	57.679	59.227	57.506	58.787	57.800	25½	1.437.272	- 185.481
London General Omnibus	*	...	...	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Maidstone Corporation	240	247	256	243	248	253	282	284	295	269	26	6.565	+ 638
Manchester Corporation	19.468	19.099	18.597	18.501	19,765	20.409	21.693	21.498	21.118	21.274	26	537.327	+ 39.898
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	242	235	239	209	237	233	273	310	221	253	26	6.244	+ 443
Newcastle-on-Tyne Corporation	6.517	6,373	7.005	7.027	7.117	7,810	8.156	8 208	8.150	8.142	26	203.370	+ 29.640
Newport (Mon.) Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
New St. Helens and District	1.132	1.187	1.130	1.000	1.111	1.459	1.631	1.681	1.468	1.343	13	21.086	5.931
Northampton Corporation	759	733	725	731	731	834	895	896	913	986	26	21.820	- 3 033
Nottingham Corporation	4.191	4.187	4,063	4.084	4.592	4.548	4.603	4.671	4.693	4.592	26	113 938	- 10 554
Oldham Corporation	2.636	2.504	2.414	2.512	2.498	2.969	3.049	2.908	2.770	2.948	27	77.835	+ 8 504
Portsmouth Corporation	3.291	3.320	3.370	2.839	2.884	3.137	3.675	3.601	3.123	3.282	—	—	—
Preston Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Provincial	2.885	2.894	2.951	2.547	2.591	2.681	3.162	2.967	2.657	2.813	52	122.038	+ 1.379
Reading Corporation	957	975	983	909	924	1.114	1.163	1.152	1.111	1.132	25½	27.199	+ 4.602
Rhondda Tramways	1.399	1.488	1.449	1.412	1.409	1.541	1.626	1,659	1.661	1.630	39	57.942	+ 8.128
Rochdale Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Rotherham Corporation	1.678	1.657	1.682	1.789	1.625	1,837	1.858	1.870	1.895	1.906	26½	47.807	+ 6.410
Salford Corporation	5.489	5.607	5.369	5.611	5 800	6.663	7.026	6.727	6.448	6.896	26½	175 638	+ 27.927
Sheffield Corporation	10.702	10.599	10.812	10.752	11,505	12.141	12.573	12.586	12.236	12.672	27	323.012	+ 36 803
Southampton Corporation	1.828	1.916	1.900	1.737	1,721	2.114	2.341	2.310	2.165	2.243	25½	52.217	+ 8 233
Southend-on-Sea Corporation	...	1.350	1.225	1.054	...	...	1.186	999	916	...	25	26.825	+ 94
South Metropolitan Tramways	*	...	...	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	971	892	869	864	...	985	1.017	985	990	...	25	24,226	+ 2.800
Sunderland Corporation	1.732	1.872	1.638	1.679	1.603	1.827	1.969	1.912	1.859	1.851	26	47.939	+ 4.040
Sunderland District	685	724	714	640	698	758	792	794	807	775	48	34 300	+ 4 846
Swindon Corporation	236	240	225	222	220	273	302	293	294	288	25½	7.101	+ 1.723
Torquay Tramways	955	985	976	826	742	915	1,117	1.061	892	900	39	25 810	+ 1.860
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	708	715	708	654	...	939	947	974	955	...	12	11.536	+ 2.887
Wallasey Corporation	1.627	1.596	1,442	1.352	1.435	1.809	1.898	1.611	1.608	1.563	26½	43 347	+ 4.900
Walsall Corporation	876	838	819	848	869	971	1.006	1.010	1.062	999	26	25 398	+ 3 101
Walthamstow U.D. Council	1.102	1.184	1.180	1.152	1.308	1.264	1.364	1.310	1.362	1.218	26	33 799	+ 3 635
Warrington Corporation	520	515	506	506	534	566	577	570	584	590	26	13 899	+ 1.070
West Ham Corporation	3.152	3.184	3.268	3.243	3.666	3.778	3.924	3.772	3.913	3.744	25½	96 715	+ 11.079
Wigan Corporation	1.694	1,716	1.766	1.733	1,781	1.993	2.036	2.067	2.048	2,003	26	50.912	+ 6 830
Wolverhampton Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Yorkshire (West Riding)	1.898	1,912	1.806	1.894	1.915	2.424	2.437	2.260	2.209	2.261	39	82.566	+ 13.849

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

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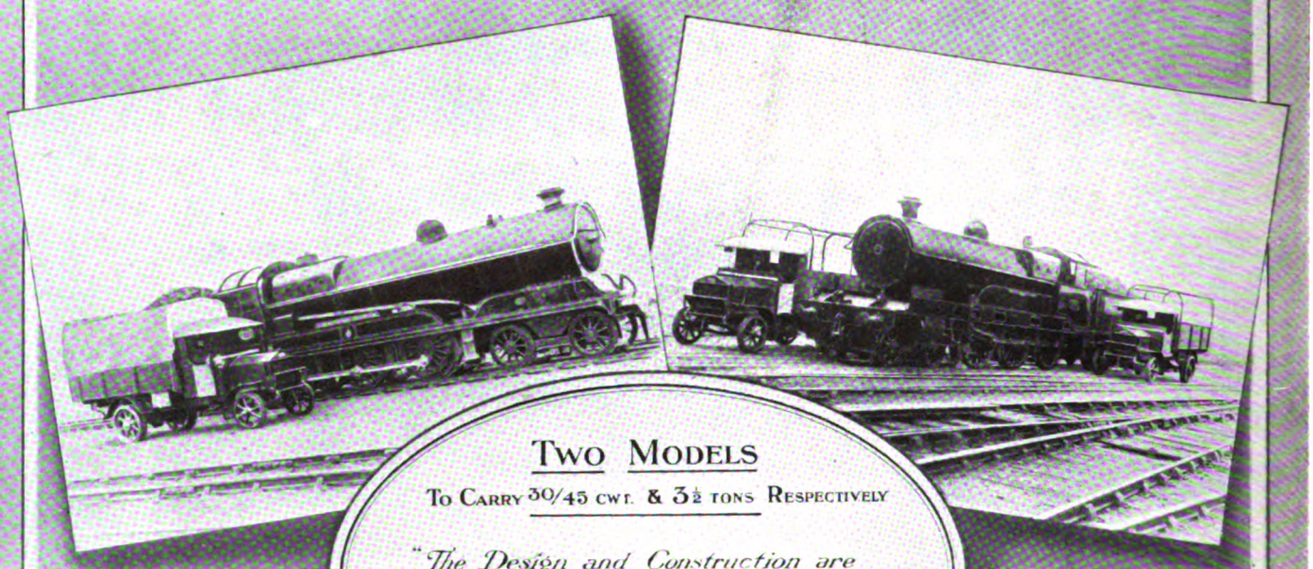

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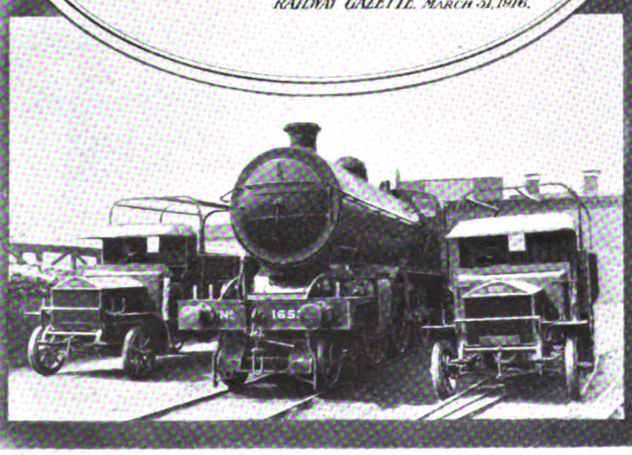
"The Design and Construction are Throughout of a Character, which it would be Exceedingly Difficult, if not Impossible, to Improve Upon."

RAILWAY GAZETTE, March 31, 1916.

IN PEACE

USED BY THE LARGEST CARRYING COMPANIES AND COMMERCIAL HOUSES.



IN WAR

USED BY THE BRITISH AND ALLIED GOVERNMENTS.

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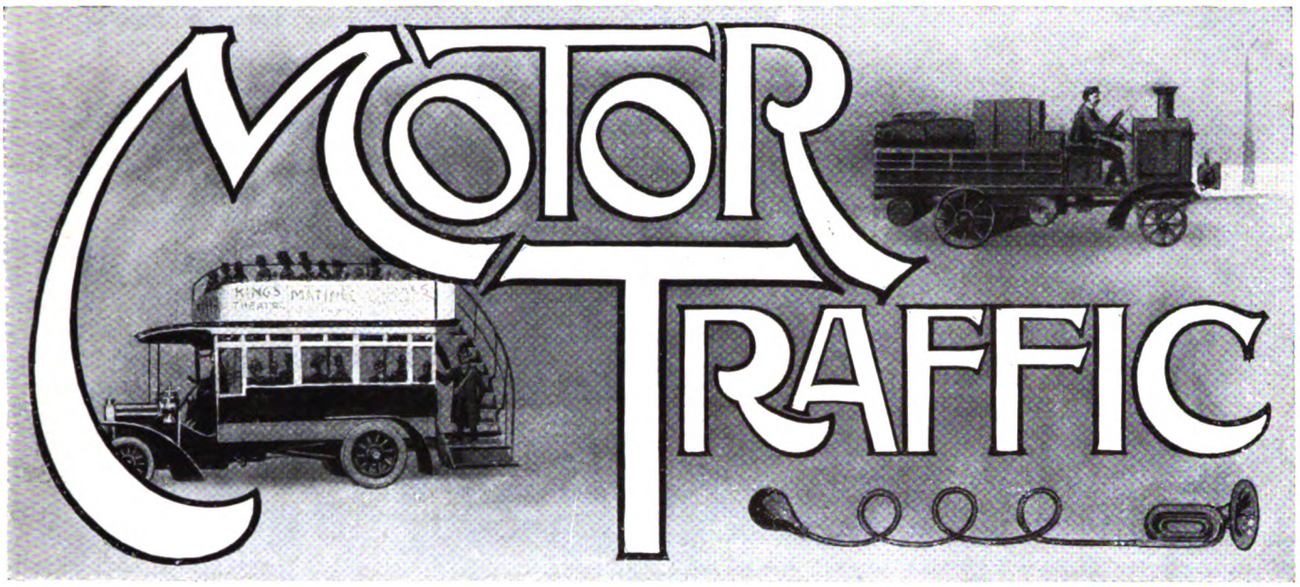

We learn that what may, perhaps, be described as a semi-official suggestion has been made to municipalities to the effect that they will have to look beyond petrol or coal in order to find the fuel of the immediate future for their motor vehicles. From this it is deduced that their attention must necessarily be turned to the electric vehicle. The alternative of the steam lorry is ruled out, not because of shortage of suitable fuel, but rather because the output of the manufacturers is required for other purposes. Consequently, the charging of vehicle batteries from electric mains drawing their supply originally from coal is not inadmissible. At the same time, there is no real justification for any suggestion to the effect that the electric vehicle is the only possible solution of the present difficulty. The progress that has been made in the use of coal gas has lately been so rapid as to negative this contention in a very satisfactory manner.

* * * * * *

Admittedly, in many forms of municipal work the electric vehicle has excellent opportunities. Thus, for example, in the transport of refuse and the work of street cleaning, much of which has to be done in the small hours of the morning, silence in running is a factor of distinct importance. Moreover, the electric method lends itself to traffic work, since it eliminates change speed gears and thus renders possible very steady acceleration and retardation. Weight is of course against electric batteries and so is their somewhat limited radius of action, but in many municipal services, including those concerned with the local carriage of passengers, the latter drawback is of practically no importance. Arrangements can easily be effected by which discharged batteries can be removed, and replaced by others fully charged, in a very few minutes at the terminal points of the service. Moreover, partially discharged batteries can be " boosted " up at a high rate during the comparatively short intervals required for the driver's meals. It is, however, a mistake under present circumstances to advocate the electric method of propulsion by encouraging municipalities to adopt it, not so much on account of its intrinsic advantages as upon the assumption that it is the only thing to do. Even in its present elementary form, the disadvantages attaching to the use of coal gas are in the main something like those that face the electric system. In other words, the carriage of the source of power is inconvenient and the radius of action is limited. Coal gas, being capable of use either approximately at atmospheric pressure or when compressed to a considerable degree, offers, in respect of its containers, a choice between weight and bulk. Therefore, where weight is a drawback and bulk is not, it has a decided advantage over electricity. As regards recharging, coal gas has certain advantages over electricity. In the former case, the work only takes a few minutes ; in the latter, the time occupied must be measured in hours. So far as radius of action is concerned, the case is much the same in the two instances. In other words, we have to compromise between carrying dead weight or inconveniently bulky containers on the one hand, or a strictly limited length of journey on the other.

* * * * * *

It will probably turn out that the report of the British Commercial Gas Association published in our last issue presented a very conservative statement of the case for coal gas, basing conclusions on the limited knowledge available at an extremely early stage in the movement. It is possible, and indeed probable, that the whole structure of the report, based as it is on the theory that pressures much in excess of 25 atmospheres are not practical, will be found to be faulty. There are already signs to the effect that this pressure will be considerably exceeded, in which case the consequence will be to make it possible to carry larger stocks of fuel with a smaller increase of dead weight. Moreover, the account did not anticipate any such improvements as are suggested by the possibility of storing the gas in absorbent materials, and so increasing the effective capacity of the containers without materially increasing their weight or dimensions.

* * * * * *

We are only at the beginning of investigations into the possibility of coal gas, and the end should not be rashly prejudged. But coal gas has the great advantage that it can be used on any existing vehicle intended to burn petrol. While new petrol vehicles are difficult to obtain, this is equally true of electric vehicles, and there are at present infinitely more of the former than of the latter in service. We do not disagree with the advice given to municipalities to consider the electric system, but we feel strongly that such advice ought to have been coupled with the suggestion that they should also consider the possibility of using coal gas on their existing petrol vehicles. It happens that at the present moment there is nothing to be said against the consumption of coal gas, and in fact there are urgent reasons which favour the encouragement of a demand for this fuel. The same cannot be said of any other

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MOTOR TRAFFIC.

source of power, the creation of which demands the consumption of coal for that specific purpose alone. Our coal supplies need conserving with all possible economy, and the justification for employing coal in the creation of coal gas lies, not so much in the need for that product itself, as in the need for other products simultaneously brought into existence and urgently required for war purposes.

In our last issue we referred to the relations existing between taxicab drivers and operating companies, and the underlying causes that have influenced the establishment of those relations. It will be interesting to note the consequences of the latest development in the form of a Home Office Order authorising an increase in London cab fares. The drivers have always been opposed to this, for the simple reason that the minimum fare of eightpence generally means the payment of a shilling, out of which the driver gets fourpence as a tip as well as his share of the amount registered on the meter. An increase in the minimum payment up to a shilling for the first mile would, as the drivers maintain, often mean an identical payment by the fare, but a redistribution so far as the driver and his employer are concerned, a larger sum being registered on the clock and a smaller going direct into the pocket of the driver. Thus, the mere chance that the rate originally fixed encourages a fairly liberal tip has been the means of preventing a much-needed increase from being legalised for a very long time past. It does not seem that the drivers have yet realised what the real choice before them is, namely, that the companies cannot go on upon the old basis and must either charge more or cease work altogether. On a straight issue, the owner-driver ought to welcome the increase, but perhaps he may take a long-headed view and conclude that the best thing for him is to see the companies' cabs taken off the road altogether, and then—but not till then—demand an increase in fares. On the whole, this new development is merely another reason for taking the view that we have already expressed, namely, that the future lies with the owner-driver and not with the company or its men.

Attention is again drawn to the possibilities of alcohol fuel by the publication of the first report of the Special Committee of the Commonwealth Advisory Council of Science and Industry, which has its headquarters at Melbourne. Australia annually wastes enough molasses to produce some three million gallons of alcohol. There are also infinite possibilities of growing alcohol crops on cheap land, and so producing the spirit in quantities and at a price rendering it capable of filling the great bulk of the liquid fuel demand of Australia. The Commonwealth Government is therefore the first within the British Empire to take up this matter officially. It is to be hoped that enough funds will be made available to allow it to be carried through to a finish. The Committee finds it necessary first of all to educate public opinion, and this it intends to do by exhibiting specially-designed alcohol engines at work at agricultural shows and elsewhere. It will endeavour to popularise first the use of the slow-speed high compression stationary engine of the type that will consume alcohol with a high degree of efficiency. A rather secondary place in its programme is given to the work of popularising the use of alcohol as part of a mixture with some other fuel in the engines of motor vehicles. The main reason for this general line of action lies in the difficulty of perfecting a complete system of distribution for a new class of motor fuel. The system built up by the petrol importers is a very fine and complete one, and it is difficult to see how a competitive fuel, unless supported by an equally extensive system of distribution, can be made to hold its own. The Australian Committee has therefore decided that, in popularising the stationary alcohol engine, it is working along the line of least resistance and is inaugurating a movement which, when carried to success, will undoubtedly bring in its train the other and greater development. The whole subject is of immediate importance to us here, principally because if Australia makes its own liquid fuel, it will cease to be a market for petrol and will consequently help to reduce a demand which bids fair to outstrip supply and to drive and keep up the price to an abnormal figure.

ELECTRIC TOWER WAGON COSTS.

In view of the curtailment of petrol supplies, Mr. T. W. Bloxam, city electrical engineer of Belfast, has prepared the following report upon the use of electric vehicles during the past two and a quarter years :—

"In May, 1915, we commenced using a wagon with Edison battery in place of a petrol-driven wagon for the repair of the overhead equipment. The vehicle has enabled the department to effect very material saving in the cost of this work, where facility for starting, stopping, and manœuvring in traffic more than counterbalances any loss of time on the road, unless the journey is to a distant part.

"Comparing the running costs per mile with the petrol vehicle, our records give us the following figures :—During the two and a quarter years ended July, 1917, the electric ran 7,398 miles and used 6,651 units of electricity, or ·89 unit per mile. The petrol vehicle ran 5,800 miles and used 1,621 gallons petrol, or ·28 gallon per mile.

"The cost of electricity to tramways for year ended March, 1917, was 1·137 pence per unit. The average price of petrol over the year was 2s. 3½d. per gallon. Therefore during the year to March, 1917, the electric cost 1·01d. per mile for electricity, and the petrol wagon cost 7·77d. per mile for petrol—a saving of 6¼d. per mile, or approximately £70 per annum, by using electricity.

"The repairs required by the electric are substantially less than those for a petrol vehicle. The only repair was the result of an accident in April, 1916, which necessitated rewinding the armature of the motor; since that date the vehicle has only required to be thoroughly cleaned and repainted.

"As regards commercial electric vehicles generally, certain firms in the city have for some time realised the considerable saving that can be effected by their use compared with the petrol vehicle. One firm has the following five vehicles in use :—Two 5-ton Edison lorries, two 1-ton Edison delivery vans, one ½-ton Edison delivery van. The above are charged by this department during the night, and represent a revenue of about £200 per annum, without involving the department in any additional capital expenditure for machinery or mains."

COMMITTEE ON GAS TRACTION.—Professor Cadman, director of the Petroleum Executive, announced on October 10 that Mr. Walter Long, M.P., the head of the Executive, had decided to form a committee on gas traction. It will consider the development of this form of traction, both now and after the war. The Petrol Controller is about to place greater restrictions on the uses for which petrol may be employed.

CHARGES FOR HIRE OF MUNICIPAL CARS.—In view of the heavy addition to the working costs of the Glasgow Corporation garage owing to the war, the Garage Committee recommend that the present charge of 4d. per mile and 4s. 6d. per hour for the use of the cars by Corporation Committees and officials be increased to 6d. per mile and 6s. 6d. per hour.

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MOTOR TRAFFIC.

COMPRESSED COAL GAS FOR MOTOR LORRIES.

A SUCCESSFUL GLASGOW EXPERIMENT.

Mr. Richard Liggett, of the Glasgow Gas Department, recently described before the Gas Department Foremen's Association his early experiments with coal gas as a fuel for motor lorries. A special committee of the Gas Committee was appointed about the same time to investigate the subject. With the assistance of this committee Mr. Liggett continued his experiments, and the results so far obtained are recorded in a report he has just presented, which is summarised in the *Gas World*.

For the purposes of Mr. Liggett's work nine cylinders were borrowed from the Cowlairs locomotive works of the North British Railway Company—one 6 ft. by 2 ft. 6 in., four of 8 ft. 9 in. by 1 ft. 6 in., two of 4 ft. 8 in. by 1 ft. 6 in., and two of 4 ft. 8 in. by 1 ft. 4 in., with ¾-in. connection at one end, ends convexed. These were tested up to 250 lb. pressure. The two 4 ft. 8 in. by 1 ft. 6 in. were fitted, one on each side of the chassis, and one of the 4 ft. 8 in. by 1 ft. 4 in. at the rear of the chassis, thus getting a holding capacity of 400 cubic feet of gas at 200 lb. The other six cylinders were coupled together in the yard for the purpose of forming a quick charging battery. The battery contains 1,785 cubic feet of gas at 250 lb. pressure.

For compressing the gas Mr. Liggett made two force pumps, 4 in. diameter, 14 in. stroke, single-acting type, working alternately and driven by a crank fitted to a small punching machine, which is driven by a belt from the workshop shafting. During the time the motor is out on the district the pumps are compressing gas into the battery cylinders, to be ready for the next charge. The time taken by the pump to compress 400 cubic feet of gas is 80 minutes, the battery cylinders supplying the same quantity in four minutes, thereby saving a great amount of time.

For the trial runs a 25-H.P. Halley 2-ton lorry was selected, the unladen weight of which is 3 tons 11 cwts., including 5½ cwts., the weight of the three gas cylinders and fittings. The tests were carried out against a measured gallon of petrol as against 400 cubic feet of gas. The results are given in the table, as also the results of enriching the gas with petrol by two methods, neither showing good result :—(1) By blowing the gas at low pressure on to one gallon of petrol in the low-pressure tank (ordinary petrol tank), which is used to allow the gas to expand before being taken up by the engine. By this method 19 gills of petrol are absorbed. (2) By the gas blowing through the trap in which a measured gallon of petrol is placed. By this method six gills of petrol are absorbed. The trap mentioned is a 5-ft. length of 4-in. steam pipe, which is placed between the pumps and the gas cylinders of the car, to trap any oil or water which may come from the pumps.

Comparative Tests in Gas and Petrol.

With the assistance of Mr. Morrison, garage superintendent of the Caledonian Automobile Services, Limited, Mr. Liggett has obtained a comparison between gas contained in a flexible holder and gas contained in a steel holder, the test being on a run with a load of two tons. With the gas department motor, gross weight 5 tons 11 cwts., including steel holders containing 400 cubic feet of gas at a pressure of 200 lb. per square inch., the consumption of gas for seven miles was 235 cubic feet, time 40 minutes, consumption of gas per mile 33·57 cubic feet. The "Caledonian" motor, a 30-H.P. Halley, gross weight 5 tons, including flexible holder containing 330 cubic feet of gas, consumed all the gas in 6·3 miles; time, 36 minutes; consumption of gas per mile, 52·38 cubic feet. This shows 18·81 cubic feet per mile in favour of compressed gas.

Table of Results of Trials run between 400 cubic feet of gas, compressed to 200 lb. per square inch, and a measured gallon of petrol; outward and inward trials being run at various loads.

Gas costing 2s. 8d. per 1,000 cubic feet; petrol costing 2s. 2d. per gallon.

July, 1917.	Gross Weight. Tons. Cwts.	Distance (Miles). Gas.	Distance (Miles). Petrol.	Time (Minutes). Gas.	Time (Minutes). Petrol.	Per Mile. Feet. Gas.	Per Mile. Gills. Petrol.	Cost per Mile. Gas.	Cost per Mile. Petrol.
Gas— Out	5 11	11·6	—	63	—	34·482	—	1·103d.	—
In	5 11	13·6	—	65	—	29·411	—	0·941d.	—
Petrol—Out	5 11	—	9·3	—	53	—	3·440	—	2·795d.
In	5 11	—	12·0	—	70	—	2·666	—	2·166d.
Gas— Out	5 0	11·1	—	65	—	36·036	—	1·153d.	—
In	5 0	14·2	—	63	—	28·169	—	0·901d.	—
Petrol—Out	5 0	—	10·0	—	47	—	3·200	—	2·600d.
In	5 0	—	12·6	—	65	—	2·539	—	2·062d.
Gas —Out	4 10	12·4	—	63	—	32·258	—	1·032d.	—
In	4 10	15·6	—	74	—	25·641	—	0·820d.	—
Petrol— Out	4 10	—	10·3	—	75	—	3·106	—	2·523d.
In	4 10	—	12·7	—	63	—	2·519	—	2·046d.
Gas— Out	4 0	13·3	—	58	—	30·075	—	0·962d.	—
In	4 0	15·9	—	69	—	25·157	—	0·805d.	—
Petrol—Out	4 0	—	11·7	—	50	—	2·735	—	2·222d.
In	4 0	—	12·5	—	57	—	2·540	—	2·080d.
Gas— Out	3 11	13·5	—	55	—	29·629	—	0·948d.	—
In	3 11	16·0	—	67	—	25·000	—	0·800d.	—
Petrol—Out	3 11	—	11·7	—	49	—	2·735	—	2·222d.
In	3 11	—	13·1	—	59	—	2·442	—	1·984d.
Gas—Total	22 12	137·2	—	642	—	29·154	—	0·932d.	—
Petrol—Total	22 12	—	115·9	—	583	—	2·781	—	2·243d.

Note.—The unladen weight of vehicle is 3 tons 11 cwts. No hills were coasted, but all were driven down at a regular speed on brakes. No adjustments were made during trials.

Table of Results by Enriching Gas with Petrol. Out Runs only.

	Weight. Tons. Cwts.	Distance. Miles.	Time. Minutes.	Per Mile. Feet. Gas.	Per Mile. Gills. Petrol.	Cost per Mile.
(1) Blowing gas on to petrol in pressure tank	5 11	14·6	70	27·390	19	1·933d.
(2) Compressing petrol with gas	5 11	12·0	67	33·333	6	1·472d.

Not Merely a War-time Expedient.

Mr. Liggett says that as a war-time or emergency expedient the flexible holder, in outlying districts, where the leakage of gas from the holder has plenty of space, may be very good; but in the city area, where many of the garages are low in the roof and very often close to or under dwelling-houses, the leakage from these holders would be somewhat objectionable and very dangerous. Their usefulness is also limited to the roofed vehicles; they are not suitable for lorry work.

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MOTOR TRAFFIC.

The use of steel cylinders in this connection should not, according to Mr. Liggett, be considered as a war-time or emergency expedient, but as a further outlet for the use of coal gas and a serious competitor to electricity or petrol in the commercial life of the city. "Compressed gas in steel or rigid holders is," he remarks, "the practical solution to the problem of carrying a supply of gas for power purposes on motor vehicles."

Mr. Liggett proceeds:—"There are four principal objections to its use:—(1) Compression is the most serious item of expense, but can easily be overcome by the battery system referred to. The gas consumed in compressing 400 cubic feet of gas in the case under review is about 12 cubic feet, costing under a halfpenny. (2) On the motor vehicles which I have seen at several places the gas is drawn from the flexible holder and supplied to the engine by an ordinary gas connection fitted to the induction pipe at or near the governor valve, the air supply being drawn through the carburetter in the usual way. This method is certainly simple, as gas or petrol can be used as required, but it is a great waster of gas, and does not allow the best results to be obtained from either gas or petrol. To get the best results from gas, a special controller or carburetter for gas only should be used to supply the engine with a proper explosive mixture. The special controller which is used on the gas-driven motor of the department gives these results, combining simplicity with utility, and by the movement of a pin gas or petrol can be used without stopping the engine. The controller is made in eight parts, the four principal being inner sleeve, outer sleeve, air cuff, and gas cuff, and is fitted to the engine by a special connection or duct inserted between the flanges of the induction pipe and the petrol carburetter. (3) The governor or reducing valve may be an objection, but it is an indispensable fitting for compressed gas, and on it the driver depends to get a regular supply of gas at low pressure, the lowest pressure being necessary for the efficient working of the engine to drain the holders of the last foot of gas. The governor used is one I have specially designed for this particular work, and it has fulfilled the conditions required of it admirably. The principal parts are body piece, high-pressure tube, low-pressure tube, valve, diaphragm, balance, and socket. (4) Wear on tires due to the extra weight carried. This objection will not prove very serious when the great saving in fuel is taken into account."

RECOMMENDATIONS.

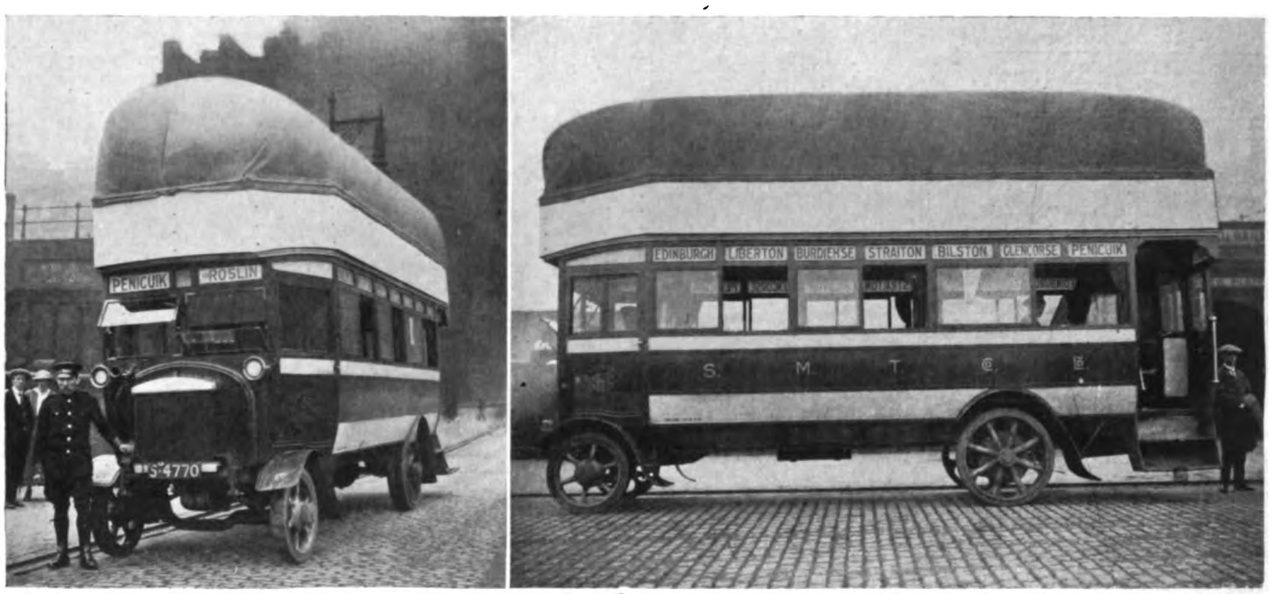
Mr. Liggett concludes his report with these suggestions:—(1) That the department prepare all their existing motors for gas. (2) That two experimental cylinders, 10 ft. by 4 ft., capable of withstanding 1,000 lb. pressure per square inch, be obtained, one to be mounted in place of the present battery to supply the department motors, and one to be mounted on a chassis to supply any consumer who may wish to give the system a trial. The system could afterwards be gradually extended. (3) That pumps or compressors be got to fill these cylinders with gas up to 1,000 lb. pressure per square inch in 60 minutes.

ROADSIDE SUPPLIES FOR MOTORS.

The Commissioner of Police for the Metropolis has asked the local authorities for their views on any proposal that may be put forward for establishing on the footways of main roads appliances to enable mechanically-propelled vehicles to obtain supplies of water, petrol, electricity, etc.

Kensington Borough Council have been advised by the Highways Committee that it might be possible to grant sites, not necessarily in the main thoroughfares, where such fittings could be installed. Before permission was given the co-operation of the police should be invited to assist in determining the suitability of the site from a traffic point of view, and the granting of the site should be subject to an annual rental. Distinction should be drawn between the vehicles requiring water only, such as steam wagons, and such vehicles as may require petrol, electricity, or gas.

Bethnal Green Council "does not consider it practicable to place the proposed mechanical 'sources of supply' appliances upon the footways of main roads, but is of opinion that consideration should be given to any application for fixing such appliances in any side streets where pedestrian and vehicular traffic is negligible."



Omnibus of Scottish Motor Traction Company Equipped with North British Rubber Company's Gas Holders.

GAS FOR EDINBURGH MOTOR OMNIBUSES.

The North British Rubber Company have come to the fore in meeting the demand for gas-holders, which is increasing daily. Their huge plant and long experience in the manufacture of rubber goods of every description gives the company an advantage in the making of flexible gas-containers, and the satisfaction expressed by the users serves to endorse the contention that there is no firm better able to provide exactly what is required. An increasingly large user is the Scottish Motor Traction Company, who run motor omnibuses in Edinburgh and district. Photographs are appended giving front and rear elevation views of a container fitted to one of the omnibuses. Another illustration shows a container fitted to a chars-a-banc of 35 H.P., supplied by Halley's Industrial Motors, Limited, of Glasgow. Ordinary domestic gas is utilised in this case without alteration of the carburetter, and the cost works out at approximately one-third of the price of petrol.

HOLDER IN PLACE OF TOP DECK SEATS.

For the use of gas on the Todmorden Corporation omnibuses the top deck seats on one vehicle have been removed as an experiment. So far the trial has proved satisfactory, with the prospect of effecting a considerable saving in the running expenses of this and other vehicles.

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MOTOR TRAFFIC.

ANNUAL REPORT OF THE ROAD BOARD.

The report of the Road Board for the year ended March 31, 1917, gives the constitution of the Board as follows:—Sir George S. Gibb (chairman), Sir J. H. A. Macdonald, G.C.B., Lord Montagu of Beaulieu, Lord Pirrie, K.P., and Lord St. Davids, with Brigadier-General H. P. Maybury, C.B., manager and engineer (now serving as Director of Roads on the staff of the Director-General of Transportation in France), Mr. W. Rees Jeffreys, secretary, and Mr. J. S. Killick, acting engineer and manager. The last-named is the County Surveyor of Hertfordshire, and he was formerly assistant engineer to the Road Board. His services have been lent to the Board during Brigadier-General Maybury's absence with the British Expeditionary Force.

The applications received by the Board for advances during the year 1916-17 totalled £1,051,905, of which £966,510, or 91·88 per cent., was for "improvement of road crusts." The advances applied for show an increase of £741,644 as compared with 1915-16, and a decrease of £949,359 as compared with 1914-15.

Receipts and Payments.

The receipts credited to the Road Improvement Fund and the payments out of the fund up to March 31, 1917, are summarised in the following statement:—

Receipts and Payments.	Year ended March 31, 1917.	Total.
Receipts.	£	£
Motor spirit duties	—	4,075,608
Carriage licences	—	2,786,809
Interest and profit on investments and loans	152,902	530,680
	152,902	7,393,097
Payments.		
Administrative expenses	*17,167	93,086
Paid under grants	318,636	2,976,782
Paid under loans	110,124	1,090,227
	445,927	4,160,095
Deduct loans repaid	191,359	496,598
Net payments	254,568	3,663,497

* Including £4,912 expenditure in connection with acquisition and equipment of offices in South Kensington. This capital outlay will enable an annual saving of about £600 to be made in rent, etc.

Purposes of Grants and Loans.

Grants and loans made up to March 31, 1917, have been made in respect of the following classes of improvement work in the United Kingdom:—

Classification.	From May, 1910, to March, 1916.		During Year ended March, 1917.	
	Grants.	Loans.	Grants.	Loans.
	£	£	£	£
Improvement of road crusts	3,253,444	947,712	186,274	103,820
Road widenings and improvement of curves, gradients, and corners	293,744	26,843	1,412	6,304
Road diversions ...	69,895	4,060	624	—
Reconstruction and improvement of bridges	86,525	280	863	—
New roads and bridges	538,849	1,208	2,035	—
Total	4,242,457	980,103	191,208	110,124

Great advantage has been derived since the outbreak of the war from the improvements effected on important roads with the assistance of grants and loans from the Road Improvement Fund. But the heavy motor traffic due to the war had caused great damage, and notwithstanding the expenditure of nearly one and a half millions for special work out of army and other Government contributions, an extensive road mileage had greatly deteriorated. The expenditure by highway authorities on maintenance had been reduced for financial reasons, and also owing to the shortage of labour, and considerable leeway would therefore have to be made up after the war before the roads were restored to their pre-war condition.

Policy During the War.—Work Done for Government.

Meanwhile the policy of the Board in regard to making grants and loans has been continued on the lines laid down by the Treasury, as set forth in paragraph 12 of the Board's report for 1915-16. During the current year the Board are distributing, with Treasury sanction, a sum of £200,000 out of the Road Improvement Fund mainly in the form of assistance to expenditure on tar treatment of main county roads in Great Britain which are in a suitable condition for tar treatment. In doing so they are endeavouring to secure that sections of road which were improved with the aid of Road Board grants prior to the war shall be preserved, as far as possible, in a condition which will prevent the benefit of improvements already made being lost.

Apart from the question of deferred maintenance expenditure and special damage caused to roads by heavy motor traffic in connection with the war, the question of expenditure required in the near future for the improvement of roads has been considered, and the Board's views thereon are set forth in a letter dated January 19, 1917, addressed to the Reconstruction Committee.

The Board have continued the special work which they undertook after the outbreak of war at the request of the Army Council. Similar work has, with Treasury approval, been undertaken for the Admiralty, Ministry of Munitions, and Timber Supply Department of the Board of Trade. The total estimated expenditure on works sanctioned by the aforementioned departments up to March 31 last, which have been or are being carried out by or under the supervision of the Board, is £2,760,141, of which the sum of £2,364,541 is on account of the War Department.

DUNLOP'S NEW DEPARTURE.

A Commercial Vehicle Owners' Department has been established by the Dunlop Rubber Company, whose knowledge and experience are at the service of firms on their register of owners under their "pink form" agreement.

Any owner of a commercial delivery van used exclusively for the conveyance of goods is entitled to enter his name on the company's "pink list," and by so doing he will, we are officially informed, save a substantial amount on all purchases of Dunlop tires and accessories, besides receiving free advice on all matters appertaining to them.

The Dunlop Company's new trading season having commenced on October 1, owners of delivery vans not already on the list should write to the "C.V. Department," Dunlop Rubber Company, Limited, Aston Cross, Birmingham, for particulars of the advantages conferred by it.

Standardisation of American Motor Trucks.—Fifty automobile engineers were called to Washington in August to serve on the Board for the standardisation of motor trucks and parts. The War Department have taken over the work from the Society of Automotive Engineers. Arrangements were made for the accommodation of 100 or more draughtsmen, tracers, etc., and many manufacturers offered their assistance. The Continental Motor Company placed at the Government's disposal the whole of their drafting-room staff and equipment, an offer which was promptly accepted.

York Omnibuses and Volunteer Service.—A suggestion has been made that the electric omnibuses of York Tramways Department might be registered with the local squadron of the Motor Volunteer Corps, and that the department should provide uniforms for such of the drivers who might join the corps. The Tramways Committee have replied that they do not consider the vehicles useful for the purpose, having regard to the circumstance that they required stations for charging. As to uniforms for the men, the committee do not consider that the Corporation should bear the cost.

Passing Slowly-Moving and Standing Vehicles.—The attention of the London "Safety First" Council has been called by St. Pancras Council to the great danger to pedestrians owing to fast-moving traffic being permitted to pass both on the near and off sides of slowly-moving or standing vehicles, and to suggest that a regulation is very desirable in this connection. The "Safety First" Council have replied that the suggestion has been considered, and that opportunity will be taken of inviting the attention of the Commissioners of the Metropolitan and City Police to the point.

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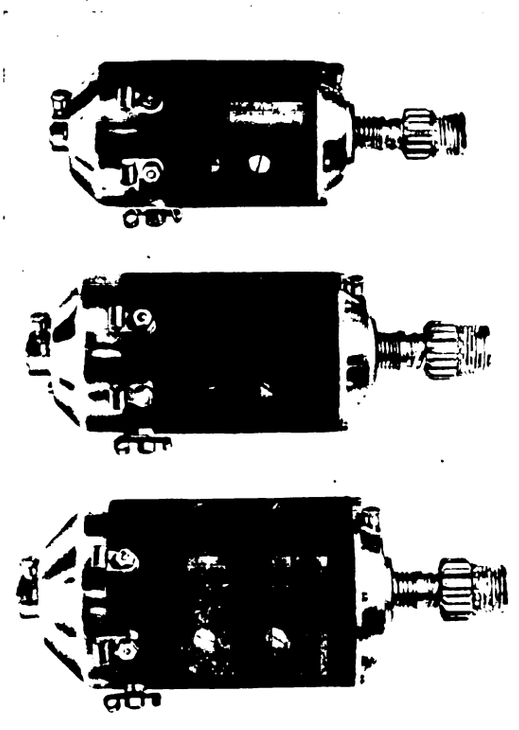
MOTOR TRAFFIC.

THE C.A.V. GEARED ELECTRIC STARTERS.

An electric starting motor may either be a separate machine or may be combined with a lighting dynamo, these taking the form of a single dynamotor. It is not yet possible to say with absolute certainty which type will ultimately prevail, but there are many and strong arguments in favour of the separate motor, the designer of which has to concentrate only on a single problem and so is enabled to secure the maximum degree of simplicity and efficiency. To combine the functions of a lighting dynamo with those of a motor involves certain complications in respect always of field magnet windings and sometimes also of armature windings. The problem of transmission between the electric machine and the car engine also becomes an extremely difficult one. Even if, by the adoption of separate machines for the two jobs, this transmission problem is simplified as far as possible, it is still by no means easy of solution. Looked at from this side of the case, separate starting motors may be divided into two groups, namely, those which drive by friction and those which drive through positive gearing. A satisfactory positive drive is difficult to arrange for certain reasons. First, the operation of the starting motor must be brought about in as simple



The C.A.V. Geared Electric Starters.

a manner as possible. The movement of the switch which allows current to flow through the windings must also suffice to complete the transmission. The gears must be brought into mesh without shock, and until they are fully in mesh the motor ought not to attempt to exert its full power. Otherwise, damage to the edges of the gear teeth may ensue. Later on, when the engine has started and is running under its own power, the transmission must be automatically disconnected, as there is a risk that the armature of the starting motor will be pulled round at an excessive speed and damage will result. If the designer can meet all these conditions while providing a positive drive, he will no doubt prefer to do so rather than to use a friction drive. The positive method in its best forms can be cheaper, lighter, more efficient and more simple to instal in a satisfactory manner.

Mr. A. H. Midgley, the designer of the C.A.V. geared starters has satisfied himself and others that the difficulties connected with the positive drive can all be overcome, and also that a better electric installation is provided by using a separate dynamo and motor than by using a combined dynamotor. The accompanying photograph shows the three sizes of the C.A.V. geared electric starters. The smallest is for engines up to 16 H.P., the second for engines up to 40 H.P., while the largest is powerful enough to start engines up to 150 H.P. All three are identical as regards the principles of their design. The method by which the transmission gears are engaged and disengaged is highly ingenious and satisfactory. The transmission consists of a pinion upon the armature shaft of the motor, which must be brought into mesh with gears cut on the periphery of the engine flywheel. The gear ratio of the transmission varies from 8 to 1 to 12 to 1, and the starting motor, running at 1,200 to 1,500 revolutions per minute turns the engine crankshaft at 100 to 150 revolutions per minute, according to circumstances.

The armature of the starting motor is normally pressed endways by a controlling spring, so that it does not lie exactly in the centre of the magnetic field which is created as soon as current flows through the field and armature windings. Directly this happens, the pull of the magnetic field draws the armature endways over a distance of about a quarter of an inch against the pressure of the controlling spring. This brings the pinion on the armature shaft just into mesh with the gears upon the engine flywheel, the current flowing through the coils of the motor being for the time only a light one. The first meshing of the gears is thus brought about without shock. The complete meshing is due to a totally different cause.

The pinion on the armature shaft is not keyed to the shaft, but is arranged to run upon a quick screw thread. When the motor is at rest, the position of the pinion is determined by the light coiled spring shown in the photograph. As soon as the pinion begins to mesh with the gears upon the flywheel, the rotation of the armature causes it to spin along the screw thread, stretching the spring and completing the full engagement of the gears. While this is happening, the electrical connections are so varied that the motor commences to develop its full power, and directly the gears are thoroughly engaged it exerts all the force that is necessary to turn the engine crankshaft at the required speed to ensure prompt starting. When the engine begins to run under its own power, the gears upon the flywheel over-run the pinion on the armature shaft and consequently screw the pinion away out of engagement. This movement is assisted by the light coiled spring. At the same time, the starting motor, being relieved of its work, ceases to take current from the battery, and the magnetic field falls away and allows the armature to be pushed bodily by its controlling spring back to the normal stationary position. This movement, of course, helps to bring about the certain disengagement of the transmission.

We have referred to the fact that the strength of the current is increased while the transmission gears are being brought into mesh, and a brief explanation as to how this is effected becomes necessary. The operation of the starting motor is brought about by the pressure of the foot upon the pedal switch. The first movement of this pedal allows current to flow through two of the four field coils of the motor. These two coils are wound with wire of somewhat high resistance. The circuit is completed through a portion of the armature coils, of which the remaining portion is for the moment cut out of action by a subsidiary brush which, in addition to the two main brushes, bears upon the commutator. As the pedal is depressed still further, this subsidiary brush is thrown out of action, so that the current passes through the whole of the armature windings. At the same time, the other two field coils which are wound with stout wire of low resistance are brought into circuit in parallel with the first two already mentioned. The motor is now able to take its full current and to develop full power to overcome the first inertia of the car engine.

The system of engagement is original when regarded as a combination of actions, each one of which singly is already known and used. The system of varying the current is, so far as we are aware, now employed for the first time in this form.

As befitting the C.A.V. products, the motors are admirably constructed and beautifully finished, all the materials employed having been very carefully selected. The machines are light, and their simplicity makes it possible to produce them at a thoroughly competitive price. They are in every way calculated to uphold the high reputation of the electric equipments which come from Messrs. Vandervell's works.

MOTOR DELIVERIES FROM A COMMUNAL KITCHEN.—During the first week in September the Hammersmith Council opened a public kitchen at the local baths, to which five distributing centres are attached. The enterprise is connected with the effort to conserve the food supply, and in course of time it is intended to increase the number of depots to fifteen, thus providing for 30,000 meals a day. The food is delivered by motor vans from the central kitchen Two Ford vehicles suffice to serve the first five depots. The charges for the food have been arranged so that no burden can fall on the rates, and it is hoped that a profit will be made so as to enable the Council to gradually pay off the sum of £1,650 expended on fitting up the kitchen and purchasing the vans.

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MOTOR TRAFFIC.

TESTS OF NAPIER LORRIES.

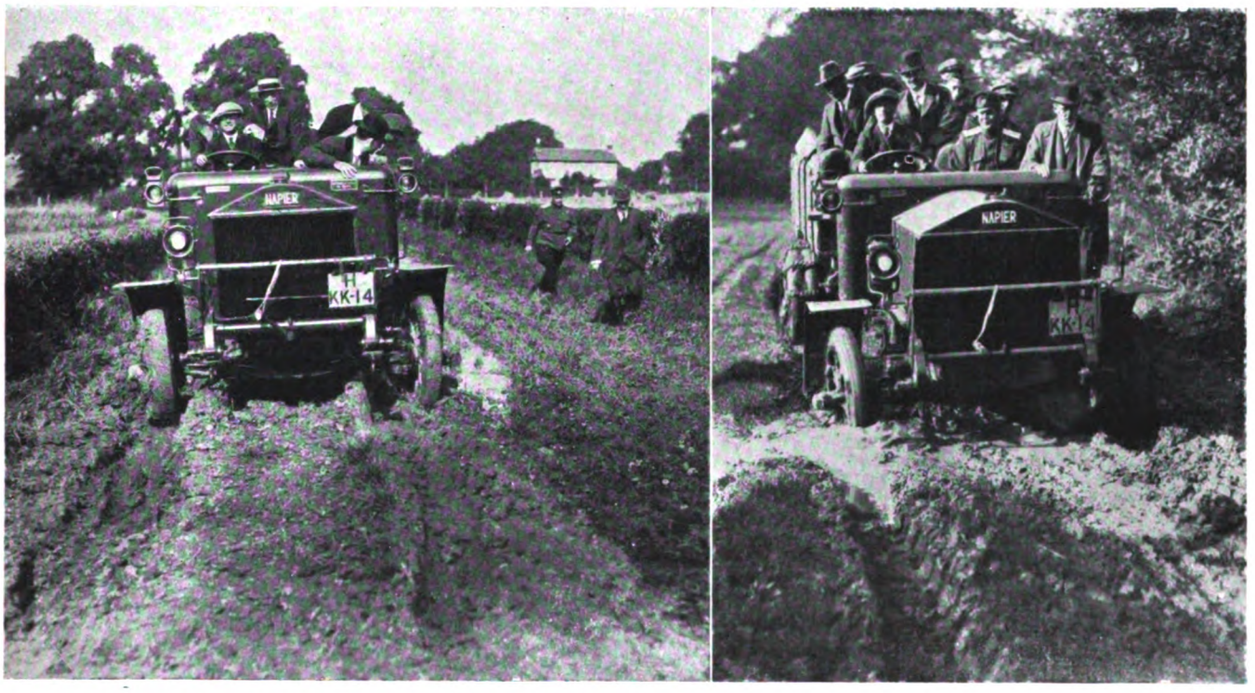
FOR THE RUSSIAN FORCES.

It is not generally known that transport lorries for the British and Allied Governments are subjected in this country to most arduous tests under real battle front conditions, i.e., over ground

A Russian General Inspecting the Chassis.

embracing seas of mud, road obstacles, and steepest gradients, with full load up. The accompanying photographs give a vivid idea of what the test means and what the lorries go through in the various war areas as they carry ammunition to batteries which are seldom adjacent to a road. The vehicles shown undergoing the tests are Napier lorries built for our Russian ally, and one photograph shows the inspection by the Russian General and his staff, all of whom are expert engineers. The other two views speak for themselves; the lorry is going through a veritable sea of mud.

It is satisfactory to know that the Napier came through the test with flying colours without an involuntary stop. The total weight is just under 8 tons, including chassis, body, ballast, and passengers, which makes the performance all the more remarkable, and a further tribute to British workmanship.



Napier Lorries Undergoing Tests.

MOTOR TRANSPORT FACILITIES.

GREAT GROWTH OF ROADSIDE DEPOTS.

The Commercial Motor Users' Association, 83, Pall Mall, S.W.1, have published a handbook of "Approved Depots," at which owners and drivers of motor wagons are assured of the necessary roadside facilities to enable their important work to proceed. At no time in the past fifteen years has more reliance been placed upon motor transport than is now inevitable. Munitions, food supplies in all categories, and much passenger transport of national importance have become increasingly dependent upon quick conveyance by road; the Association's efforts are directed towards the provision of efficient housing, maintenance, and supply service along all the principal trunk routes, both for man and vehicle.

The following routes are exhaustively organised, according to the data in the Handbook, London being treated as the starting (or terminal) point in each case:—(1) Grantham, Doncaster, and Newcastle-upon-Tyne; (2) Cambridge and King's Lynn; (3) Norwich and Great Yarmouth; (4) Colchester, Ipswich, and Lowestoft; (5) Canterbury, Margate, and Sandwich; (6) Folkestone and Dover; (7) Tonbridge and Hastings; (8) Brighton; (9) Portsmouth; (10) Winchester, Southampton, and Bournemouth; (11) Salisbury, Exeter, and Plymouth; (12) Bristol and Plymouth; (13) Bath, Bristol, and Weston-super-Mare; (14) Gloucester, Cardiff, and Swansea; (15) Oxford and Worcester; (16) Birmingham, Liverpool, and Manchester. Sundry extensions are also indicated.

The alphabetical lists of information cover the principal towns and villages on all routes. The approved depot is indicated on a street map, whilst the text sets forth the accommodation in detail, as regards different classes of commercial motor—petrol, steam, or electric. A separate section goes into detail concerning existing charging facilities for electric vehicles. There are also sections dealing with legal matters, tire-pressing stations, coal and coke depots, lights on motor vehicles, technical hints for drivers, a directory of British commercial motor forms, and an index. Mr. F. G. Bristow, the secretary, compiled the Handbook, which comprises 300 pages, and is sent post-free for 1s. 9d.

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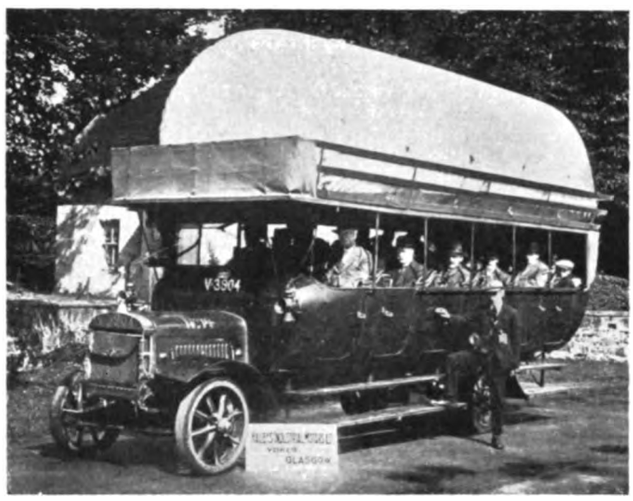
MOTOR TRAFFIC.

HALLEY GAS-DRIVEN CHARS-A-BANC.

The appended illustration shows a 35-H.P. Halley chars-a-banc running on ordinary domestic gas without any alteration of the carburetter. The cost of running on gas in the case of this vehicle is, we are informed, approximately one-third that of petrol.



ALBION TANK WAGONS.

By special permission of the War Department, the Albion Motor Car Company, Limited, has recently supplied to the Union Petroleum Products Company, Limited, the tank wagon shown in the accompanying illustration The wagon has a capacity of 1,000 gallons, and is driven by an engine of 32 H.P. This is the fourth repeat order

placed with the Albion Motor Car Company by the same firm, and it indicates in a way which must be highly gratifying to the makers the sound design and excellent running qualities of their chassis.

RED CROSS CARS SUPPLIED BY MINERS.—The Yorkshire Miners' Association have subscribed £45,306 for providing ambulances for the British Red Cross Society, paying levies of from 1s. to 3s. a week.

CO-ORDINATION OF ENGINEERING TRAINING.—A movement is on foot to establish a central organisation for the improvement and better co-ordination of engineering training, and the appointment of a representative committee of engineering and educational interests to initiate action. The proposal is arousing much interest in engineering and educational circles, and Sir Maurice Fitzmaurice, president of the Institute of Civil Engineers, will preside at a meeting to consider the scheme at the Institute on October 25.

HALLEY WAGON FOR WAR SERVICE.

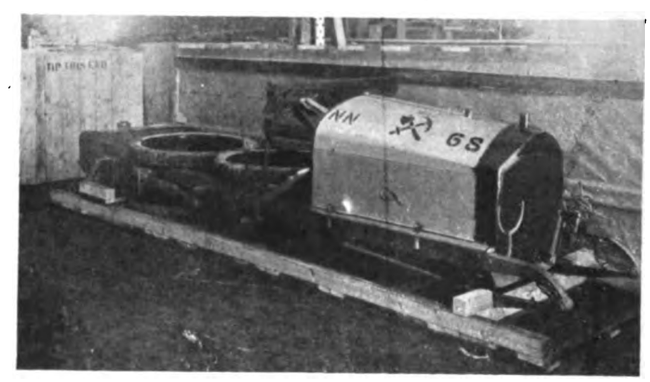
An increasingly large number of motor vehicles is being supplied to the War Department for use with the British armies abroad by Halley's Industrial Motor Company, of Glasgow. These vehicles are also a familiar feature for military and munition work on the

45-h.p. 4-ton Halley Tipping Wagon.

roads of the United Kingdom. The subjoined photograph depicts one of the latest tipping wagons of 45 H.P. supplied to the War Department.

NAPIER CAR PACKED FOR TRANSPORT.

Besides supplying many thousands of cars, lorries, and aircraft for the British naval and military forces, the motor manufacturers of this country have contributed very largely to the resources of our Allies. The appended illustration shows a motor car ready for packing at the Acton Works of D. Napier and Son, Limited.



Napier Car Being Packed for Export.

Long experience, before and during the war, has rendered the despatch staff of Napier and Son adepts at this ingenious method of preparing cars for shipment. The result is that the minimum of space is occupied in transit, and the machines are easily re-assembled at the port of debarkation.

MEN FOR THE MECHANICAL TRANSPORT CORPS.—An announcement has been issued stating that men are urgently required for enlistment in the mechanical transport section of the A.S.C. Skilled motor drivers are accepted between the ages of 35 and 50 years, and men over military age as motor mechanics. Men of low medical categories, of 25 years and over, can enlist as learners. The pay is 2s. 2d. a day and separation allowances.

CONTAINER EQUIPMENT PROGRESS.—A. Barton and Sons, of Beeston, Notts., have now disposed of nearly 400 flexible gas containers for public passenger and commercial vehicles, and a considerable number of orders are in hand.

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MOTOR TRAFFIC.

GLASGOW'S CLEANSING MOTORS.

Mr. W. Greig, superintendent of the Cleansing Department of Glasgow Corporation, in his annual report, states that the department has two petrol refuse removal vans, two electric removal vans, twelve petrol street sweepers, and one traction engine and trailers for farm work. The two petrol 3-ton wagons have been utilised since the begininng of 1913 for the removal of domestic refuse. Whilst these wagons are advantageous in some respects, notably in the rapid transit of the material to the destructor works, the cost, due mainly to the numerous stoppages during the process of collection, does not compare favourably with horse haulage. The respective figures are :—Petrol motor traction, 3s. 9·52d. per ton ; horse traction, 3s. 3·15d. per ton. Extensive repairs have again been required by these machines, and on several occasions they have been out of commission owing to the difficulty of obtaining materials for carrying out the necessary repairs. This explains to some extent the high cost above stated. Further, experienced drivers and mechanics are difficult to obtain, and it is obvious that these machines are labouring under a severe handicap under present conditions. In the circumstances any statement of costs is not of real value, and does not admit of a fair comparison. Pending a return to normal times better results can scarcely be expected.

Two Edison 2-ton electric vehicles have been purchased. The wagons were put into commission on December 13, 1916, and May 1, 1917, respectively, and so far the results obtained seem to be fulfilling expectations. The figures for the partial period are :—Electric vehicles, 2s. 10·65d. per ton ; horse traction, 3s. 3·15d. per ton.

The fleet of petrol-driven street sweepers numbers twelve. While the results obtained compare favourably with horse haulage, it is evident that even more advantageous results may be looked for in normal times. The remarks made in connection with the petrol wagons in regard to difficulties attending upkeep, etc., are applicable in this case also. As compared with horse haulage, the working costs are :—Petrol street-sweeping machine, 3·81d. per 1,000 square yards swept ; horse-drawn street sweepers, 4·78d. per 1,000 square yards swept.

Traffic Inducement by the L.G.O.C. Group.—Throughout the war the London General Omnibus Company have maintained their spirited and admirably conceived work at traffic inducement on behalf of the allied underground and road transport organisations. "The American's London" is the subject of the latest series of announcements now appearing in various London newspapers, and it is proving of interest to the general public as well as to the sailors and soldiers of the United States, and to those of Canada, who are to be seen in the Metropolis. The announcements give valuable information relating to the ancient buildings that have an association with historic personages who were identified with this country and America.

AUSTIN FLEET OF OMNIBUSES.

An indication of the wide district from whence the Austin Motor Company draw their large number of employees is given in the appended photograph of a portion of the company's fleet of motor omnibuses Ten of these single-deck vehicles are depicted standing outside the Northfield Works, Birmingham. As each conveyance can accommodate not far short of twenty-five passengers, it will be understood that the Austin Company have a large number of workpeople residing beyond the limits of other means of locomotion. In addition the company's enterprise no doubt enables other employees to arrive at the works earlier than if they relied upon public conveyances.

The importance of bringing employees to their daily tasks in as fresh a physical condition as possible has long been recognised. At no period, however, has it been more necessary than during the three years of strenuous work necessitated by the waging of the world-wide battle against the enemies of civilisation. The Austin Motor Company's experience in the transport of their workpeople should prove the more valuable because of the large number of vehicles employed, and when they are at liberty to again manufacture for the wants of the public generally they will have some interesting statistics of working costs with which to assist their sales, if such an excellent machine as the Austin needs that aid.

Austin Fleet of Motor Omnibuses.

SPECIAL RAILWAY WAGONS FOR AUTOMOBILES.

Railway traffic in America in automobiles has grown to such great proportions that the railways find it worth while to furnish the manufacturers with the greatest facilities for the transport of motor cars. A number of the railways provide closed wagons for the purpose. One of the latest types of these wagons has been constructed for the Chicago and North Western Railway by the Western Steel Car and Foundry Company. The wagon has a large centre door providing easy access for the vehicles, which are carried in complete security.

Institution of Automobile Engineers.—At the opening meeting on October 10 of the 1917-18 session of the Institution of Automobile Engineers, held at the Royal Society of Arts, the presidential address was given by Lieut.-Colonel R .K. Bagnall-Wild, chief inspector of the Aeronautical Inspection Department. Mr. L. A. Legros, the retiring president, mentioned that Colonel Bagnall-Wild had during the past four years organised a body of 5,000 inspectors, recruited from every class and rank of trade. Aircraft construction turned to useful account men whose trade was entirely different before the war. The organ-builder was the best man for the erection of aeroplanes. Next to him came the pattern-maker, and the chair-maker in civil life easily surpassed all others in the making of propellers.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

NEW COMPANY TO MANUFACTURE ELECTRIC VEHICLES.—The Grimsby Electric Vehicle Company, Limited, has been registered with a capital of £5,000 for the manufacture of battery-propelled vehicles.

MOTOR CYCLE AMBULANCE.—Mr. F. W. Sykes has presented a motor-cycle ambulance for the conveyance of wounded soldiers at Huddersfield. It will accommodate any single stretcher, and is electrically lighted.

OMNIBUSES AND ROAD PAYMENTS.—Berkshire County Council have forwarded a resolution to the County Councils of the United Kingdom requesting that legislation be introduced for the payment of a fair mileage rate by the proprietors of motor omnibuses. It is being generally adopted.

U.S.A. MOTOR FUEL FROM BARLEY.—Under the Food Conservation Law of the United States, which came into operation on September 8, the use of barley for the distillation of spirits was prohibited. Sixty million bushels are being released, however, for the manufacture of denatured alcohol for motor fuel and other purposes.

COMMERCIAL VEHICLES FOR NATIONAL EMERGENCIES.—The London Chamber of Commerce is organising a meeting of owners of commercial motor vehicles which is to be addressed by Field Marshal Lord French, who will explain his desire for the enrolment of such vehicles in the Motor Volunteer Corps for national emergencies.

USE OF THE RED CROSS ON CARS.—It is officially notified that permits to use the Red Cross emblem on motor cars must in all cases be applied for, and will only be granted if the car fulfils these two conditions :—(1) That it is used solely for the conveyance of sick and wounded soldiers ; (2) that it has been placed at the disposal of the military authorities for this purpose.

AMERICAN WOMEN AS VOLUNTEER MOTOR DRIVERS.—More than 3,000 calls for drivers of passenger cars and motor trucks had been answered by the emergency drivers of the women's section of the Navy League at Chicago up to August 10. Society women have abandoned the limousine wheel for that of the truck, carrying tents, food or clothing to the naval training station at Great Lakes, Ill. The League will supply a woman driver for an army or navy truck within a few minutes after such a driver is requested.

RAID CASUALTIES IN COMPARISON WITH STREET ACCIDENTS.—During the first nine months of this year (January 1 to September 30) 487 persons were killed, and 14,104 injured in traffic accidents in the metropolitan police district—a number well below the normal, due to reduction in volume of traffic—while during the same period 191 persons were killed and 749 wounded as the result of aeroplane raids. Of the 749 wounded a great number only received slight injuries. From this it is apparent that the losses caused by aeroplane raids are not so serious as might be inferred.

THE PROFITABLE LOAD FOR OMNIBUSES.—Following an accident to a motor omnibus in the Gower peninsula, there has been a newspaper discussion on the alleged dangers of heavy passenger motor traffic. The *South Wales Daily Post* remarks that the omnibus proprietors make out a good case when they point to " their wonderful immunity from serious accident on the hilly roads of Gower. There is no doubt the omnibuses are good, and that the institution of double-deck vehicles would probably lead to more roof travelling, and therefore more danger. They, however, rather overstate the case when they say in effect that they are commercially called upon to take big loads, because they find that less than 34 seated passengers per omnibus does not pay."

MOTOR VEHICLES FOR MUNICIPALITIES.

CARDIFF COUNCIL have decided to construct a garage for electric vehicles.

WALTHAMSTOW COUNCIL have ordered a 5-ton steam wagon for the use of the highways department.

BOLTON COUNCIL have referred to a sub-committee the tenders received for the supply of a 2-ton battery vehicle.

BODMIN STREETS COMMITTEE have been directed to consider the question of obtaining a mechanical street sweeper.

LAMBETH COUNCIL have accepted the tender of the Lacre Motor Car Company for the supply of a road sweeping machine.

LONDON COUNTY COUNCIL have purchased a second-hand car for the use of the officer in charge of the ambulance service.

MANCHESTER COUNCIL have placed a contract with Newton and Bennett, Limited, for the supply of a motor car for the gas department.

HOLLAND COUNTY COUNCIL have referred to committee an application made by the medical officer for a motor cycle to be purchased for use in the Council's service.

WEST HAM COUNCIL have applied to the Local Government Board and to the Ministry of Munitions for permission to order six battery vehicles for dust collection.

SALFORD COUNCIL have been recommended by the Lighting and Cleansing Committee to obtain a 2-ton battery tipping wagon from Edison Accumulators, Limited, at £1,123.

BRADFORD GUARDIANS have been recommended to obtain a two-seated car for the use of the workhouse master in place of another car which is being used for the visitation of the Board's various institutions.

KENSINGTON COUNCIL have applied to the Petrol Control Committee for a licence to enable petrol to be obtained for a car which it is proposed to purchase for the use of the superintendent of outdoor work.

WALSALL COUNCIL have purchased a second-hand steam lorry for the gas department, in place of a new vehicle for the supply of which they were unable to obtain a priority certificate from the Ministry of Munitions.

CAMBERWELL COUNCIL have made an allowance of £20 per annum to one of their sanitary inspectors for the upkeep and repair of a motor cycle, which he is obliged to use in consequence of having lost a leg during his service with the army.

NORFOLK COUNTY COUNCIL have agreed to the county surveyor inspecting two second-hand tractors offered for sale at £500 each, with a view to purchasing one for the cartage of granite and gravel for the roads in the western part of the county.

SOUTHEND COUNCIL have received the sanction of the Ministry of Munitions to the manufacture of four battery vehicles ordered from Messrs. Ransomes, Sims and Jefferies. As there is no definite guarantee as to the date for delivery, the surveyor has been instructed to obtain a higher priority certificate if possible.

NEWCASTLE STREETS COMMITTEE have sanctioned a proposal by the engineer's department to purchase an electric wagon at an estimated cost of £1,123. Mechanical traction is rendered necessary by the shortage of horses and the increased charges for hired cartage. The increase amounts to 78 per cent. on the pre-war rates. A statement presented on the cost of working the present battery wagon during 41 weeks shows that there had been a saving of £195, or 32 per cent., as compared with the cost that would have been entailed by the use of horses.

PETROL ECONOMY OFFICER.

Mr. Walter Long, M.P., who has been requested by the War Cabinet to take control of all questions affecting petroleum oils and petroleum products, has appointed Professor Cadman, C.M.G., Petroleum Adviser to the Colonial Office and Professor of Mining of the University of Birmingham, to be his technical adviser and liaison officer between the various Government departments. Professor Cadman will also take charge of an organisation which will be established for giving effect to Mr. Long's instructions, and will assume the title of Director of the Petroleum Executive. Mr. E. S. Shrapnell-Smith, chairman of the Joint Committee of Mechanical Road Transport Associations, has been appointed Economy Officer to the Petroleum Executive, and he will be concerned in introducing economies both in His Majesty's Services and in the civil use of petroleum and petroleum products. The headquarters of the Petroleum Executive are at 8, Northumberland Avenue, London, W.C.2.

MOTOR COMPANIES' REPORTS.

VAUXHALL MOTORS COMPANY are paying an interim dividend of 9d. per share.

NORTHERN GENERAL TRANSPORT COMPANY.—An interim dividend at the rate of 5 per cent. per annum (6d. per share) has been declared on the ordinary shares for the past half-year.

BIRMINGHAM SMALL ARMS COMPANY.—This company, which includes the Daimler Motor Company, have declared a final dividend of 5 per cent., and a bonus of 10 per cent., on ordinary shares, making 20 per cent., free of income-tax, for the year ended July 31. The ordinary shares received for 1915-16 the same amount as is proposed for the past twelve months. In 1915 the ordinary share capital was increased by one-half by the capitalisation of a portion of the reserve fund. The present distribution is therefore equal to 20 per cent. on the previous capital. The ordinary shares received 30 per cent. for 1914-15, and 15 per cent. per annum for many preceding years.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

WALSALL CORPORATION TRAMWAYS.

Stores.

The Corporation of Walsall invite tenders for the supply of the undermentioned stores to the Tramways Department for the year 1918:—

Motor Grease.	Castings.
Lubricating Oils.	Trolley Wheels.
Cleaning Material.	Cement, etc., etc.

Forms of tender and further information may be obtained at the Tramway Manager's Office, St. Paul's Buildings, The Bridge, Walsall.

Tenders sealed and endorsed "Tender for Stores" are to be sent to the Town Clerk, Council House, Walsall, on or before Monday, November 5.

Samples (which will not be paid for by the Corporation) are to be sent to St. Paul's Buildings, The Bridge, Walsall.

The Corporation do not bind themselves to accept the lowest or any tender, and they will not accept the tender of any firm or person paying to their workmen less than the standard rate of wages.

R. L. HORSFIELD,
General Manager.

St. Paul's Buildings,
The Bridge, Walsall,
October 16, 1917.

POSITIONS VACANT.

ASSISTANT ELECTRICAL ENGINEER WANTED.

Assistant Electrical Engineer required for the Government Railway Department, Gold Coast, for two tours of 12 months, with possible extension. Salary £300—£10—£350. Free quarters and passages, and liberal leave on full salary. Candidates, who must have thorough practical training in electrical and mechanical engineering, with good experience of Diesel engines, three-wire direct-current installations, and overhead and underground cables, and also knowledge of repairs to motors and application of power to railway workshops, should apply at once in writing to MESSRS. PREECE, CARDEW, SNELL & RIDER, 8, Queen Anne's Gate, Westminster, S.W.1, quoting M/8248. No person engaged on Government work, or eligible for the Army, need apply.

TRUCK OVERHAULER.

Truck Overhauler, leading hand, accustomed to re-wheeling and all truck repairs.—Apply, stating wages required and experience, to ENGINEER AND MANAGER, Rhondda Tramways Co., Ltd., Rheola Road, Porth, Glamorgan.

ELECTRICAL FITTER.

Electrical Fitter for car depot; wages 50s., 53 hours; overtime rates, etc. Permanency.—Apply SUPERINTENDENT, Corporation Tramways, Chester.

CHARGE ENGINEER.

Charge-engineer wanted in combined A.C. and D.C. power station.—Apply stating age, experience and wages required, enclosing copies of not more than three testimonials to the BURGH ELECTRICAL ENGINEER, Blackhall, Paisley.

FOREMAN PLATELAYER.

Wanted. Working Foreman Platelayer, permanent job.—Apply, giving particulars of experience and wages required, ENGINEER AND MANAGER, Rhondda Tramways Co., Ltd., Porth, Glam.

FOR SALE.

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(*b*) Boiler House Plant.
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- Sundry Steam Pipes and Valves.

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H. A. HOWIE, Manager.

Electric Supply Department,
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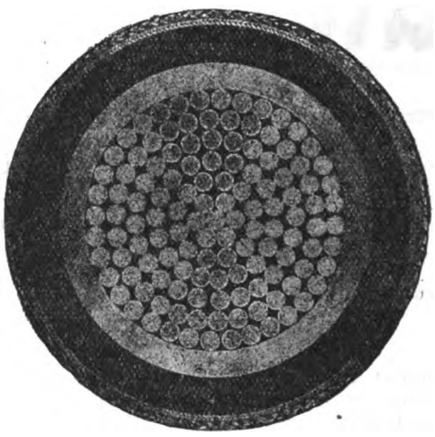

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THE
Tramway AND Railway World

Established in 1892 and Published by

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SATURDAY, OCTOBER 20, 1917.

THE REGULATION OF PASSING VEHICLES.

WITH the growing use of motor conveyances for commercial and industrial purposes the risks to pedestrians tend constantly to increase. Probably the best remedy would be to follow the example of Glasgow Corporation and to secure special by-laws requiring an overtaking vehicle before passing on the near side of a stationary tram car to come to a standstill. The Glasgow authorities obtained their inspiration, we believe, for this regulation from the practice in certain towns in America, where the rule has been found to work well. Two occurrences have recently emphasised the importance of this matter. The first is a representation by St. Pancras Borough Council to the London Safety First Council of the risk pedestrians incur owing to fast moving traffic being permitted to pass both on the near and off sides of slow-moving or standing vehicles. The Safety First Council have replied that an early opportunity would be taken to invite the attention of the Commissioners of the Metropolitan and City Police to the matter. No doubt the St. Pancras Council had in mind motor vehicles and tramcars, for no conveyance except a tramcar is permitted to be passed on either side. This option is given as the result of a decision in the case of Burton *v.* Nicholson in the King's Bench Division, 1909. It has since been legal for motor cars to meet or overtake tramcars on whichever side of the road appeared to the driver to be the more safe. With this exception the rules of the road affecting motor traffic are now the same as those relating to other vehicles, and are based on section 75 of the Highways Act, 1875, and section 28 of the Town Police Clauses Act. Briefly stated, these require a vehicle when meeting another approaching from the opposite direction to keep to the left, or when overtaking a vehicle proceeding in the same direction to pass on the right or off side. Consequently, if it is suggested by St. Pancras Council that fast traffic is permitted to pass on both the near and off sides of slowly moving or stationary vehicles, the assertion is a reflection on the police. Assuming that such a condition of affairs does exist, the circumstances provide an additional argument in favour of a by-law requiring slowly-moving vehicles to keep to the near side of the thoroughfare. Tramway managers have long favoured such a regulation, and it has been strongly advocated in the interests of motor traffic. Opinion appears, therefore, to be sufficiently strong to warrant an endeavour to obtain such a regulation. The rules for passing standing vehicles have recently become more important owing to the method of regulating the entrance of tramway passengers to the cars by means of queues, a system which is likely to come into more general use. At a recent inquest at Sheffield on a woman who was accidentally killed by a motor wagon through a queue of tramway passengers first giving way to it, and then impeding it, the coroner expressed surprise that he was not more often called upon to hold a similar inquest. He urged that the police, tramway, and factory authorities should endeavour to secure better regulation of the traffic. The safest plan is, no doubt, to form the queue on the pavement. This enables the tramway official who may be in charge to exercise greater control, or if, owing to shortage of staff, there is no official in charge, the passengers would be better able to secure their own safety.

L.C.C. TRAMWAY MATTERS.

The Council resumed the fortnightly meetings after the summer recess on Tuesday.

AIR RAIDS.

Mr. G. H. Hume, chairman of the Highways Committee, in answer to questions, stated that it was in compliance with an order issued in November, 1916, by the Field Marshal Commanding the Home Forces, that drivers and conductors of cars had been required to continue their journeys during air raids. In view of recent experiences, however, it had now been arranged that cars might be brought to a standstill and the motormen and conductors might take cover during gun fire in the vicinity. It was not a fact that women conductors had been fined as much as a day's pay for leaving cars during air raids. No fines had been imposed, but in certain cases discretion had been exercised by the management, and motormen and conductors had been paid only for work done.

NEW FARE POLICY.

Mr. H. H. Gordon criticised the new fare policy of the Council. The result of increasing fares, abolishing ordinary return tickets, and placing restrictions on transfers, had been a large reduction in passengers. The number of workmen's tickets had greatly increased owing to the number of people who went to work earlier than they need do in order to escape the hardships of the new regulations.

Mr. G. H. Hume, chairman of the Highways Committee, said that the new regulations were war expedients. They were adopted to enable the services to be carried on, and the public had no conception of the difficulties. He read a long statement in which it was contended that the restrictions on the issue of transfers worked to the benefit of passengers, while greatly reducing the work of conductors and staff. The Council had only reverted to the position which existed in 1915, and he asked them to let a little time elapse in order that they might see the full effect of the changes. On the suggestion of Sir John Benn, Mr. Hume agreed that the statement which he had read should be issued to the Council in the form of a report, on which debate might take place.

A comparative statement was submitted showing the receipts and passengers carried on the tramways during the eleven weeks ended October 3, 1917. There had been a decrease of 3,469,325 in the passengers, and an increase in receipts of £81,144. The total increase in receipts from April 1 to October 3 aggregated £187,806.

The Highways Committee reported that, owing to increased rates for freight, an additional expenditure of £22,200 would be required for coal for Greenwich station during the current financial year.

In view of the serious difficulty in obtaining supplies of castings for the maintenance of rolling stock, the existing foundry facilities at the central car repair depôt were extended during the recess, the work involving the provision of a temporary building at an estimated cost of £480, and the supply of machinery at £350, the erection of the temporary building being carried out by the tramways department.

The Council approved of the invitation for tenders from selected firms for the supply of field coils for car motors, and they decided to invite tenders from selected firms for the supply of English and American ash for the provision of plough bases for the cars.

Applications were presented from employees in the traffic, rolling stock, and permanent way branches for increased remuneration, and the requests were referred to the appropriate conciliation boards. The traffic employees asked for an increase of 100 per cent. on pre-war rates.

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TRAMCARS IN AIR RAIDS.

The following notice to motormen and conductors was issued on October 12 by Mr. A. L. C. Fell, general manager of the London County Council Tramways:—

I am now instructed by the Commissioner of Police for the Metropolis to state that in view of the recent experiences it has been decided, with the assent of the Field Marshal, that notwithstanding Section 2 of the Order made on 2nd November, 1916, embodied in General Orders Nos. 683 (amended) and 685, cars may be brought to a standstill and the motormen and conductors may take cover after, but not before, anti-aircraft gunfire is heard *in the vicinity*, and after the following instructions have been carried out:—

(1) Should any car be on a gradient it must be driven to a section of track which is comparatively flat.

(2) Cars must not be close poled.

(3) Cars must not be left at intersections of crossing streets.

(4) The hand-brake of the cars must be applied to the fullest extent, and the brake ratchet wheels dogged.

(5) The controller handles must be removed if a motorman leaves his car to take advantage of the nearest cover.

Motormen and conductors should rejoin and proceed with their cars as soon as gun-firing has ceased *in the vicinity*.

I confidently appeal to the patriotism of all affected by this notice to make these arrangements a success. It is of the greatest importance in the national interest that the tramway services, which are essential for the transport of munition workers and the public generally, should be maintained if possible, and in any case resumed with the utmost despatch when the danger is over.

GOODS TRAFFIC ON TRAMWAYS.

Councillor Cheetham, chairman of Oldham Tramways Committee, has reported to that body on the points raised at the Municipal Tramways Conference. Commenting on the reference to the carriage of goods by tramways, Mr. P. Priestly, the general manager, said that in Oldham it would probably mean the laying of new lengths of rail and the provision of suitable vehicles. He had gone into the matter in regard to one or two industries, and had formed the conclusion that it would be possible to cultivate a tremendous amount of new traffic along the lines hinted at. Councillor Heywood remarked that there would not be much saving in the cost of carriage if tramways were only to carry goods to depots to be loaded up again by the consignee. The Chairman said that if the tramways could secure the carrying of a considerable part of the merchandise of the town from Manchester to Oldham one saving would be made in the cost of repairing the roads, which were damaged by heavy motor vehicles. The Committee possessed the necessary powers. No action was taken in the matter.

Dundee Tramways Committee on October 8 considered representations made by Mr. Peter Fisher, general manager, on the result of the discussion on goods carriage at the Municipal Tramways Conference. Mr. Fisher put the two governing facts of the question as follows:—(1) That electric haulage can be effected at a third of the cost of horse haulage; (2) that most of the equipment for it exists and lies idle during a large part of the day, which means a waste of capital expenditure. He urged that it would be practicable and economical to undertake the work of connecting the tramways with factories, etc., and to provide the mechanism for handling freight. This had already been successfully accomplished elsewhere.

BIRMINGHAM AND SLEEPER TRACKS.

In connection with the Birmingham Corporation schemes of town planning and the construction of new roads, Councillor S. T. Talbot has circulated with the report of the Public Works Committee on arterial roads a memorandum by Mr. Alfred Baker, general manager of the Corporation Tramways. Therein the main objections to tramways as at present constructed are set forth as follow:—(1) That the cars are heavy and cumbersome; (2) they accentuate the congestion of traffic; (3) they are noisy, and (4) their size and weight punish the tramway tracks very seriously, and the cost of maintenance, both to track and rolling-stock, is consequently extravagantly heavy.

The whole of these faults would be almost entirely dissipated by the use of single-deck cars on tracks distinct from the roadway. Mr. Baker estimates that the annual saving from independent sleeper tracks would be £70,000 in cost of reconstruction, repairs, and maintenance of permanent way, £10,000 on repairs and maintenance of rolling-stock, and £20,000 in operating expenses accruing from a better time-table. Mr. Baker explains that all the noise arises from hammered railjoints, due to the rigid construction of the track. An independent track on sleepers would be more elastic. There would be an absence of pounding of the joints, and the cars would travel practically without noise. The cost of sleeper track would be less than half the cost of ordinary construction. It is proposed that this system shall be followed in laying down a portion of the contemplated new tramways to the Lickey. Several workers of the Corporation have expressed approval of the scheme. Ald. T. Williams, chairman of the Finance Committee, was of opinion that if the people were to be carried to and from suburbs more expeditiously, development along the lines proposed was essential.

Parcel Tickets in Blocks.—Halifax Tramways Committee have acceded to the request of local tradesmen that parcel tickets should be sold in blocks of 500 at a discount of 25 per cent.

THE DEMANDS OF EMPLOYEES.

The new award of the Committee on Production to the tramways employees of Lancashire will entail an increased charge on Accrington Corporation Tramways of £900 per annum, bringing the war bonuses up to £3,000 a year. This amount is equal to about a fourpenny rate. Unless the fares are increased the money, it is expected, will have to be found by the ratepayers.

Halifax Tramways Committee have referred to arbitration a request by their employees for an advance of 4s. per week in wages. They already receive 9s. per week above pre-war rates, 4s. 6d. being wages and the remainder war bonus.

Wallasey employees have been awarded by the Committee on Production an increase which brings the wages or bonuses now being paid to men of 18 years and over to 12s. per week and to 9s. for women of 18 and over. All employees under 18 receive an increase of 1s. 6d. per day. The women have presented the branch chairman and secretary of the union with a gold ring each, in recognition of their services during the recent dispute.

Bradford Tramways Committee on October 15 referred to the War Wages Committee of the City Council an application by the employees for an addition of 8s. to the 12s. bonus they are already receiving. Combined with other concessions which are being asked for the present request would cost £42,000 per annum, and the Committee recommended that the War Wages Committee should not grant the application. It could only be met by a serious increase in fares. The Tramways Committee are agreeable to referring the matter to arbitration.

AN ENCOURAGING OUTLOOK.

Sir Robert Hadfield, the head of Hadfields, Ltd., Sheffield, holds encouraging views regarding the British steel and other industries, high wages and short hours of labour. Since the war, he says, there have been industrial developments in Britain, France, and Italy that had been regarded as impossible. Industrial England when the war ends will produce 50 per cent. more than when the conflict began, despite the absence of many workers whom the war will have destroyed. On the question of wages and hours, Sir Robert informed a representative of the *Observer*: "We find that shorter hours make good men better and bring the medium workman up to something higher than the old-time average. The war has raised British wages more than it has increased the British cost of living. So, with the shorter hours and better wages, England, with all her fit men eliminated from her industrial machine, is doing the best and biggest work of her life, because she is treating workers better than they have ever been treated in the past.

MISCELLANEOUS NEWS AND NOTES.

New Generating Station for Halifax.—Sir John Snell has reported to Halifax Tramways and Electricity Committee that they have been well advised to secure the site at Copley for the purpose of new electricity works.

Large Generators.—The General Electric Company, U.S.A., are constructing for the Kansas City Light and Power Company two 25,000 kw. turbo-generators for the new power plant of the latter company, which will ultimately have a capacity of 240,000 kw.

Cost of the Dover Accident.—The Tramways Committee propose to recommend the levying of a sixpenny rate to meet compensation claims arising from the recent accident, when ten passengers were killed and many injured. Plans have been submitted for removing the summit of the hill upon which the mishap happened.

Edinburgh Housing and Tramways.—Councillor M'Laren, addressing a meeting of ratepayers in the Calton Ward, stated that tramways and housing were the great questions in Edinburgh and were bound up with one another. All the county districts should be linked up with the city. This could only be done through an effective and cheap tramway system.

Demand for Overhead Lighting Cables.—At a meeting of York City Council, Councillor Sessions, of the Electricity and Tramways Committee, stated that if the Board of Trade would sanction the cheap and expeditious method of carrying cables which was in use on the Continent, the committee could soon provide for the adequate lighting of the city.

Lighting at Bradford.—At a recent meeting of the Tramways Committee it was pointed out that the railway trains are now fully lighted and it was urged that the lighting of the tramway cars should be improved. In view of the fact that the electric light can be switched off instantly in case of danger, it was felt that there could be no objection to increased lighting. Alderman E. Priestley said that the Committee had no power to deal with the matter, but they had already made representations to the authorities.

Increased Fares on South Lancashire Tramways.—Mr. E. H. Edwardes, general manager of the South Lancashire Tramways Company, writing with reference to a note in our last issue, in which it was stated that many of the miners had resolved to boycott the tramway cars owing to an increase of fares, says that he has received no complaint of any description from any collier. The workmen's traffic has increased to a considerable extent since the fares have been raised, and from remarks made by passengers to the company's inspectors it appears that the colliers are perfectly satisfied, and even surprised that the fares have not been increased sooner. Mr. Edwardes thinks that the statement previously published might be misleading to tramway managers who at the present moment may be considering an increase in fares in consequence of the recent heavy advance in wages.

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The Decimal System.—Dr. Addison, in the House of Commons on Wednesday in reply to Mr. King, said that the question of adopting the decimal system of weights, measures, and coinage was now being considered by the Committee on Commercial Policy after the War.

Mobility of Mining Labour.—The Coal Controller is seeking the support of the Mining Association and the Miners' Federation to a plan for setting up mining labour bureaux, so as to transfer labour from districts where it is unemployed to places which are short of men.

Decrease in the Work of the Light Railway Commission.—Owing to the falling off in the number of applications under the Light Railways Act, it is, we understand, proposed to reduce the number of paid commissioners from two to one. It is expected that Colonel Boughey will retire at the end of the year.

Joint Control of Railways.—Mr. Bellamy announced at a meeting of railway men at Shrewsbury, on Sunday last, that an important national conference of railway men would be held at Leicester in a few days. He hoped that at that conference a demand would be made for a joint control of railways in conjunction with the railway directors. State purchase of railways, he added, would not be wise at present.

Fees on Lost Property.—Exeter Corporation have adopted the manager's recommendation that a fee of 5 per cent. of the value of all found property on the cars be charged when claimed, with a minimum fee of 3d. The fees will be paid quarterly to the employees finding the property. All found property of small value not claimed within six months will be sold, and the proceeds devoted to the Employees' Recreation Club Fund, which has recently been formed, with the general manager as president.

Municipal Tramways in the War.—We have received from Mr. A. R. Fearnley, honorary secretary of the Municipal Tramways Association, an interesting return published by the Association, showing the part which municipal tramways have taken in the war. The return includes replies from eighty-four municipal tramways, and gives statements of allowances paid to dependants, war bonuses, number of men enlisted, particulars in regard to the employment of women, auxiliary drivers, etc. A summary of the information contained in the report was published in our issue of September 29.

Electric Tramway Concession.—The issues of the *Diario Official* (Santiago) of July 16 and 20 published decrees granting concessions to Don Raul Claro Solar for establishing services of electric tramways (1) in the town of Temuco, and (2) in the town of Rancagua. In each case the works must be commenced within a year from the date of the respective decree and completed within a further two years. The *Diario* of July 7 publishes a decree granting to Don Bernardo Olivier permission to instal an electric lighting and power service (overhead transmission) in the town of San Francisco del Monte, Department of Melipilla. Work must be commenced within six months from the date of the decree (July 5) and completed within a further twelve months.

PERSONAL.

Mr. Sydney Morse, owing to the Government having requisitioned his offices at No. 1, Kingsway, has removed to 79, Queen Street, Cheapside, E.C.4.

Mr. Thomas E. Allan, of South Park, Lincoln, has joined the board of Robey and Company, Ltd. Mr. Allan has been associated with the management of the company for some time.

Lance-Corporal J. Walmsley, Loyal North Lancashire Regiment, who was awarded the Military Medal in July, has been killed in action. He was employed at the Preston works of Messrs. Dick, Kerr and Company, Ltd.

Mr. W. B. Worthington, engineer-in-chief of the Midland Railway Company, has, from considerations of health, resigned the presidency of the Institution of Civil Engineers. The Council has nominated Mr. Harry E. Jones, the vice-president, to the office of president for the year 1917-18.

Mr. T. Coole was described in our issue of last week as chief engineer's assistant in the Liverpool Corporation Tramways and Electric Power and Lighting Department. The description is not quite accurate, as Mr. Coole's services are confined to the Corporation tramways, and he is Mr. Mallin's engineering assistant.

Sir Francis Hopwood, upon whom the King recently conferred a peerage, will assume the title of Baron Hopwood of Rosyth. Sir Francis Hopwood, after being private secretary to the President of the Board of Trade, became secretary of the Railway Department in 1893, and held the position of permanent secretary to the Board from 1901 to 1907.

We regret to learn that a son of **Mr. W. B. Cownie,** managing director of the National Electric Construction Company, Ltd., has been killed. He was attached to the Royal Flying Corps.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-nine of the principal tramway undertakings in the United Kingdom for the week ended October 6 give total receipts of £205,441, or £26,347 more than in the corresponding week of last year. The total length of track included in the returns was 2,058 miles.

The receipts this year were at the rate of £99 16s. 6d. per mile of single track, and last year at the rate of £87 0s. 5d., thus showing an increase for the week of £12 16s. 1d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

CONTRACTS AND ORDERS.

Messrs. Alley and McLellan have received an order from Bath City Council for a Sentinel 5-ton steam wagon at £970.

The British Insulated and Helsby Cables, Ltd., have an order from Glasgow Tramways Committee for cables.

Southend-on-Sea Council have placed an order with Edgar Allen and Company, Ltd., for switches, crossings, and fishplates, and with Hadfields, Ltd., for three pairs of points and three crossings.

Messrs. Scholey and Company, of 56, Victoria Street, London, S.W., have recently received a large number of orders for Cope's patent feed water regulators. They are supplying Sheffield Electricity Department with 14 sets (a repeat order), and others to Manchester and Birmingham Electricity Departments, the Yorkshire Electric Power Company, Ltd., Messrs. Babcock and Wilcox, Ltd., and other industrial firms. Tests and other reports have, we understand, fully demonstrated the economy and increased duty obtained from this system of feed-water control.

The London County Council, during the recess, received the following tenders for the supply of electric cables for the tramways:—Western Electric Co., Ltd., £1,430, (accepted); W. T. Henley's Telegraph Works Co., Ltd., £1,462; Callender's Cable and Construction Co., Ltd., £1,469; British Insulated and Helsby Cables, Ltd., £1,480; Johnson and Phillips, Ltd., £1,480; Siemens Brothers and Co., Ltd., £1,490; W. T. Glover and Co., Ltd., £950 (part only). The following tenders were accepted for the supply of 1,500 driving wheel and 750 pony wheel tires for tramcars:—Brown, Bayley's Steel Works, Ltd., £7,294 7s. 6d., and the Patent Shaft and Axletree Co., Ltd., £7,990 12s. 6d.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power Company, Ltd., have declared a dividend of 2½ per cent.

Rio de Janeiro Tramway, Light and Power Company, Ltd., have declared a quarterly dividend of 1¼ per cent.

Lancashire Dynamo and Motor Company. -A dividend of 5 per cent. (actual) on ordinary shares, free of tax, is announced.

Calcutta Tramways Company.—The directors have paid an interim dividend on ordinary shares at the rate of 2½ per cent., free of tax.

Montreal Heat, Light and Power Company, Ltd., have declared a dividend of 2 per cent. on the paid-up capital stock for the quarter to October 31.

Brisbane Electric Tramways Investment Company.—An interim dividend at the rate of 8 per cent. per annum (4s. per share), free of income-tax, has been declared on ordinary shares for the past half-year.

Lima Tramways.—The directors of the Empresas Electricas Associadas (Lima Light, Power and Tramways Company) have declared a dividend of 1¼ per cent. in Lima on the shares payable against coupon No. 14 in London.

Burton-on-Trent Corporation Tramways.—The Tramways Committee estimate that there will be a deficiency of £2,600 for the current year if there are no further increases in the cost of materials or wages. Transfer tickets have been abolished, but the proposed increase in fares has been suspended for six months.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended October 17 amounted to £55,381, an increase of £6,461 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to October 17 (twenty-eight and a half weeks) the total receipts were £1,597,846, an increase of £197,483 on the corresponding period of 1916.

West Ham Tramways Estimate.—It was mentioned in our issue of October 6 that Mr. Lewis Slattery, general manager of the West Ham Corporation tramways, estimated that the revenue for the current year would amount to £182,604, an increase of £16,292 over last year, and the expenditure to £197,711, an increase of £6,871, showing a deficiency of £15,107. The estimates were based on assumptions that the receipts would increase by £300 a week, and that the cost of materials would not increase by more than 10 per cent. on existing prices. We make this explanation in case the previous note may have given rise to any misapprehension.

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TRAMWAYS & LIGHT RAILWAYS
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash Oct. 18, or previous.	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	71½	72⅜
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	62/–	61/3
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	69⅜	69½
4½%	4½%	Do. 4½% Deb.	100	98½	73¼	73
5%	5%	Do. 5% Deb.	100	96	67½	68
—	—	Associated Omnibus Co., Ord. ..	5/–	1 32	1/3	1/3
1/–	7d.	Auckland Elec. Trams. Ord. ..	1	1 32	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	104	104½
—	1/–	Bath Electric Trams Pref. Ord.	1	¼	4/–	4/–
6d.	6d.	Do. 5% Cum. Pref. ..	1	32	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72⅝	71¾	71¾
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77¼	77½
14/–*	20/–*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	19⅛
6/–	6/–	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	76
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	44¾	45½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	90½
4/–	4/–	Brisbane Elec. Trams. Ord. ..	5	7½	6 32	6¾
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27½	25
6%	5%	Do. Pref. Ord.	100	106	28½	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	41	39
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	84½	84¼
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96⅛	50¾	50
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28	28
6%	6%	Do. 6% Cum. Part. Pref.	100	—	73	72½
5%	5%	Do. 5% Deb.	100	92	75	76
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65⅜	65⅜
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/–	6/6*	Calcutta Tramways Ord. ..	5	7½	6 32	6 32
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71½	71½
1/–*	1/–*	Cape Elec. Trams.	1	16	11/–	11/–
1/3	1/3	City of B. A. Trams	5	5½	85/–	85/–
4%	4%	Do. 4% Deb.	100	97⅜	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82¼	81
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/–	4/–	Dublin United Trams. Ord. ..	10	8	7¼	7⅜
6/–	6/–	Do. 6% Pref.	10	12	10 32	10 16
—	—	Hastings & Dis. Elec. Tram Ord.	10/–	16	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	16	10/–	10/–
4½%	4½%	Do. 4½% Deb.	100	67⅛	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/–	16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79¾	79¾
2/6	3/–	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44¾	44¾
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	8	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 32	9 32
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	70¼	79½
9d.*	9d.*	Llandudno & Colwyn B. Ord. ..	1	—	15/–	15/–
—	1½d.	London & Sub. Traction Ord. ..	1	64	1/9	1/9
6d.	6d.	Do. 5% Pref.	1	16	5/9	5/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61⅛	61⅞
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	78	78½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	32⅜	32⅜
3/–	3/–	Madras Elec. 6% Pref. ..	5	5 16	85/–	85/–
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9d.*	Manaos Trams & Ltg. Ord. ..	1	32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	66	66
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33	33
—	—	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	38½	40½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	92¼	92¼
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/–	National Steam Car	1	32	20/–	19/–
9d.*	9d.*	New General Traction	1	32	7/3	7/3
8d.	6d.	Northern Gen. Trans. Ord. ..	1	32	13/–	13/3½
6/–*	3/–	Para Elec. Rlys. Ord.	5	4½	81/3	75/–
5%	5%	Do. 5% 1st Deb.	100	89½	76	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/6	7/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/9	13/–
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8d.*	Potteries Elec. Trac. Ord. ..	1	32	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	8	19/9	19/9
3/–	3/–	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	87½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	78	78½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/–	12/–	Shanghai Elec. Cons.	10	13	14⅜	14⅜
3d.	3d.	Singapore Elec. Trams. ..	5/–	¼	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/–	2/–	Un'd. El. Tr. Monte Video Ord.	5	4½	50/–	50/–
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	67	69
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	½	18/3	18/3
3/–	3/–	Do. 6% Cum. Pref. ..	5	¾	83/9	83/9
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21¾	16	17
—	—	Undgd. Elec. Rys. of London ..	10	21½	37/6	37/6
		Do. "A"	1/–	⅜	6/4	6/3
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102¾	102¾
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102½	101½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	84¼	84

*Indicates dividend for the year. In other cases the dividend is for the half-year

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

Names.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Oct. 9	430	434	+ 4	27	12,081	+ 1,024
Aberdeen Corporation ..	,, 10	1,880	2,040	+ 160	19	42,314	+ 4,765
Ayr Corporation ..	,, 13	300	338	+ 38	22	12,473	+ 1,129
Belfast City	,, 12	5,950	6,848	+ 898	28	177,196	+ 17,524
Birkenhead Corporation ..	,, 14	1,598	1,777	+ 179	28½	51,973	+ 7,728
Birmingham Corporation	,, 6	17,079	19,634	+ 2,555	27	490,131	+ 38,732
do. Motor Omnibuses ..	,, 6	960	1,248	+ 288	27	27,467	+ 189
Blackburn Corporation ..	,, 10	1,123	1,387	+ 264	28⅔	43,772	+ 6,505
Blackpool & Fleetwood ..	,, 13	566	675	+ 109	40	39,215	+ 39
Bournemouth Corporation	,, 17	2,118	2,396	+ 278	28¼	76,527	+ 5,315
Bradford Corporation ..	,, 13	6,928	7,094	+ 166	28	217,660	+ 19,687
Bristol	,, 12	5,085	5,645	+ 560	41	223,278	+ 21,016
Burnley Corporation ..	,, 13	1,677	1,837	+ 160	..	..	..
Burton-on-Trent Cor. ..	,, 14	310	325	+ 15	28	8,712	+ 770
Bury Corporation ..	,, 14	1,410	1,580	+ 170	28½	48,075	+ 5,709
Chatham & District ..	,, 11	1,343	1,176	— 167	41	53,097	+ 2,216
Cork Electric	,, 11	567	577	+ 10	41	22,571	+ 1,479
Derby Corporation ..	,, 13	1,180	1,222	+ 41	28	34,169	+ 1,239
Dublin United	,, 5	7,058	7,512	+ 454	40	268,326	+ 26,049
Dundee City	,, 10	1,394	1,505	+ 111	21½	33,339	+ 3,056
East Ham Corporation ..	,, 13	1,298	1,308	+ 10	28	40,140	+ 2,536
Exeter Corporation ..	,, 12	427	396	— 30	28	11,689	— 51
Glasgow Corporation ..	,, 13	23,899	26,341	+ 2,442	31	511,799	+ 58,979
Glossop (U.E. Sup. Co.) ..	,, 13	146	171	+ 25	41	6,262	+ 551
Halifax Corporation ..	,, 9	2,044	2,273	+ 229	27⅞	70,822	+ 5,612
do. Motor Buses ..	,, 9	49	51	+ 2	27⅞	1,345	— 92
Hastings and District ..	,, 14	960	1,200	+ 240	41	52,206	+ 7,854
Huddersfield Corporation	,, 13	2,790	2,996	+ 206	28	93,775	+ 8,017
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,682
Ilford U.D. Council ..	Oct. 13	678	713	+ 35	28	21,970	+ 2,212
Ipswich Corporation ..	,, 13	476	665	+ 189	28	20,085	+ 4,444
Isle of Thanet ..	,, 12	336	195	— 141	2	350	— 324
Kilmarnock Corporation	,, 13	174	200	+ 26	21¼	4,272	+ 372
Lanarkshire	,, 11	2,416	2,883	+ 467	41	112,975	+ 17,706
Lancashire United ..	,, 10	1,884	2,354	+ 470	41	95,960	+ 20,827
Leeds City	,, 13	9,909	10,521	+ 612	28	312,040	+ 31,403
Leicester Corporation ..	,, 6	3,536	4,068	+ 532	..	..	..
Leith Corporation ..	,, 15	867	1,024	+ 157	21¼	23,718	+ 4,180
Leyton U.D. Council ..	,, 11	1,557	1,694	+ 137	28	53,828	+ 5,409
Liverpool Corporation ..	,, 6	14,619	16,843	+ 2,224	39⅔	618,383	+ 55,379
Llandudno & Colwyn Bay	,, 5	327	370	+ 43	44½	15,973	— 928
London County Council	,, 17	48,920	55,381	+ 6,461	28½	1,597,846	+ 197,483
Maidstone Corporation ..	,, 10	221	222	+ 1	28	7,088	+ 659
Manchester Corporation	,, 13	19,216	20,475	+ 1,259	28	579,684	+ 43,772
Nelson Corporation ..	,, 13	196	219	+ 23	28	6,707	+ 509
Newcastle-on-Tyne Cor. ..	,, 13	7,150	7,884	+ 734	28	219,551	+ 31,551
New St. Helens & Dist. ..	,, 10	1,075	1,224	+ 149	15	23,736	+ 6,335
Northampton Cor. ..	,, 12	721	820	+ 98	28	23,539	+ 3,293
Nottingham Corporation	,, 11	4,077	4,546	+ 469	28	123,197	+ 11,671
Oldham Corporation ..	,, 14	2,468	2,840	+ 372	29	83,514	+ 9,402
Portsmouth Corporation	,, 13	2,686	2,599	— 87	..	..	..
Provincial	,, 13	2,373	2,267	— 106	1⅔	4,559	+ 367
Reading Corporation ..	,, 11	930	1,120	+ 190	28⅔	29,542	+ 5,406
Rhondda Tramways ..	,, 4	1,419	1,659	+ 240	40	59,601	+ 8,368
Rotherham Corporation	,, 17	1,590	1,859	+ 269	29¼	51,467	+ 6,826
Salford Corporation ..	,, 15	5,413	6,515	+ 1,102	28⅔	188,573	+ 29,919
Sheffield Corporation ..	,, 14	10,709	12,218	+ 1,509	29	347,440	+ 40,051
Southampton Cor. ..	,, 10	1,771	2,143	+ 372	27⅚	56,685	+ 9,109
Southend-on-Sea Cor. ..	,, 10	833	592	+ 241	28	28,847	— 599
South Shields Cor. ..	,, 13	854	926	+ 72	15	27,042	+ 3,009
Sunderland Corporation.	,, 7	1,655	1,820	+ 165	27	49,759	+ 4,205
Sunderland District ..	,, 10	889	903	+ 14	50	36,014	+ 5,015
Swindon Corporation	,, 10	209	265	+ 56	27¼	7,663	+ 1,853
Torquay Tramways ..	,, 4	648	823	+ 175	40	26,633	+ 2,035
Tyneside Trys. & Trmrds	,, 2	636	912	+ 275	14	13,341	+ 3,366
Wallasey Corporation ..	,, 13	1,320	1,469	+ 149	28⅓	46,411	+ 5,345
Walsall Corporation ..	,, 13	842	1,002	+ 160	28	27,435	+ 3,455
Walthamstow U.D. Coun.	,, 13	1,073	1,075	+ 2	28	35,962	+ 3,648
Warrington Corporation	,, 4	463	592	+ 129	27	14,491	+ 1,148
West Ham Corporation	,, 11	3,287	3,359	+ 72	27⅔	103,326	+ 11,007
Wigan Corporation ..	,, 11	1,724	2,001	+ 276	28	54,985	+ 7,404
Yorkshire (West Riding)	,, 14	1,803	2,106	+ 303	41	86,777	+ 14,423

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Oct. 14	£53,349	£53,666	41	£2,111,396	+ £26,147
Auckland .. (28 days)	Sept. 21	20,884	22,154	12	64,876	+ 2,018
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Aug.	7,405,000	8,064,000	34	60,505,000	+ 4,492,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Aug.	423,728	454,425	8	892,803	+ 57,218
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Sept.	23,749	26,168	8	52,882	+ 4,720
Calcutta .. .. Rs.	Oct. 13	65,344	72,288	41	2,803,430	+ 20,334
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,706
Carthagena and Herrerias	Sept.	1,779	4,306	39	38,405	+ 15,805
Cordoba	Aug.	13,851	14,278	22	70,432	— 738
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Sept.	2,523	1,512	9	3,074	— 1,971
Hong Kong .. .. $	Aug. 18	18,023	12,774	33	442,008	— 34,682
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Sept.	3,993	3,450	39	36,545	— 1,076
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	Aug.	203,703	246,734	..	..	..
Madras .. .. Rs.	Sept. 30	31,788	34,219	38	624,412	+ 54,626
Manila .. .. $	July	144,913	165,693	..	..	..
Manaos .. .. Rs.	June	152,380	162,157	..	..	..
Montevideo	Sept.	26,711	29,426	48	329,679	+ 10,636
Pernambuco	Oct. 7	3,369	4,366	39	150,438	+ 29,501
Peruvian .. .. $	Sept.	911,910	950,740	13	2,905,170	+ 261,930
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Sept.	4,137	5,163	39	44,354	+ 3,026
Shanghai .. .. $	Aug. 22	21,712	22,369	..	..	..
Singapore .. .. $	Aug. 25	12,352	11,695	34	438,915	+ 13,418
Toronto .. .. $	Aug.	889,241	1,039,819	34	7,867,595	+ 775,323
Winnipeg .. .. $	Aug.	249,795	248,457	34	2,164,624	— 29,333

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

GREAT NORTH OF SCOTLAND RAILWAY COMPANY.

Contracts for Stores.

The Directors of the Great North of Scotland Railway Company are prepared to receive Tenders for the supply of the undermentioned Stores, for six or twelve months (in the Company's option), from 1st January, 1918:—

	No. of Form.
Brooms, Brushes, &c.	1
Canvas, Ropes, Flax and Twine	2
Carriage Cloth and Trimmings	3
Carriage Furnishings (Locks, Hinges, &c.)	4
Cement and Lime	5
Chamois Skins and Sponges	6
Cotton Waste, Lamp Wick, Sponge Cloths, Flannel, &c.	7
Crucibles	8
Drysalteries	9
Files, Steel and Steel Castings	11
Fireclay, Bricks, Pipes, &c.	12
Galvanised Fencing and Signal Wire and Steel Tail Ropes	13
Glass (Plate and Sheet), Lamp Chimneys, &c.	14
Handles (Hammer, &c.), and Shunting Poles	15
India Rubber Goods, Balata Belting and Engine Packing	16
Bar Iron	17
Iron Castings	18
Ironmongery	19
Leather and Leather Belting	22
Nails, Tacks, Taper Pins, Screws and Cotter Pins	24
Oils, Tallow and Turpentine	25
Soap and Candles	27
Screws (Wood) and Washers	28
Springs (Bearing, Buffing, &c.)	29
Steel Boiler Tubes	30
Steel Tires and Axles for Engines, Carriages and Wagons	31
Transfers (Carriage, &c.)	32
Telegraph Material	32A

Forms of Tenders can be obtained from the Stores Superintendent, 80, Guild Street, Aberdeen, after 9th proximo, on payment of One Shilling for each form.

Patterns may be inspected at the Stores Depôt, Inverurie, between the hours of 10 a.m. and 4 p.m., from Monday, 12th, to Monday, 19th November, inclusive, except on Saturday, 17th, when they will not be on view after 12 o'clock noon.

Tenders, endorsed "Tender for Stores," must be lodged with the undersigned not later than 10 a.m. on Thursday, 22nd November next.

The Directors do not bind themselves to accept the lowest or any Tender.

T. S. MACKINTOSH,
Secretary.

Company's Offices,
80, Guild Street, Aberdeen.
29th October, 1917.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive Tenders for the supply of the following Stores, namely:—

Steel Tires for Carriages and Wagons.
Helical Springs.
Spare Parts of Carriages and Wagons.
Wheels and Axles.
Tire-Retaining Rings.
Yorkshire Iron Screw Couplings.

Specifications and forms of Tender may be obtained at this office on payment of the fee for the Specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Steel Tires for Carriages and Wagons," or, as the case may be, not later than 11 o'clock a.m., on Thursday, November 1, 1917.

The Directors do not bind themselves to accept the lowest or any Tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.
October 24, 1917.

GREAT SOUTHERN AND WESTERN RAILWAY (IRELAND).

Contracts, 1918.

The Directors of the Great Southern and Western Railway Company are prepared to receive Tenders for the supply of the undermentioned Stores for twelve months to December 31, 1918, or part of that period:—

	No. of Form.
Acid, Sulphuric	3D
Baskets	10
Bolts, Nuts, and Rivets	15
Brooms and Brushes	13
Brass Fittings for Carriages	18
Do. do. for Lamps	18A
Do. do. for Water	26A
Do. do. for Gas	26B
Bunting	7B
Canvas and Sacks	6
Carriage Laces	7A
Castings, Mall. Iron	11
Cement	34
Cloth, Carr. and Uniforms	7C
Clothing Oil	9B
Do., I.R. proofed	9B
Coach Screws and Washers	15
Colours	2
Corks	39
Cotton Waste	5A
Crucibles	41
Curled Hair	7B
Drysalteries	3
Emery and Glass Cloth, &c.	28
Files and Tool Steel	20
Fire-bricks and Clay	33
Foundry Requisites	42
Galvanised Sheets, Buckets, &c.	23
Grates, Stoves, and Fenders	24
Grindstones	28
Glass, Sheet and Plate	27A
Glass and China Sundries	27B
Hardware (Sundry)	17
Incandescent Fittings for Gas	26C
India-rubber Goods	9A
Implements, Sundry	21
Iron Tubes and Fittings	29
Iron and Steel Wire	30A
Leather	12
Linen	8
Linoleum	7B
Locks and Keys	19
Mats, Fibre	10
Morocco	7B
Nails	31
Oak Keys	35A
Oak Trenails	35B
Plumbago	41
Railway Fastenings (Iron)	16
Railway Fastenings (Steel)	16A
Rainwater Pipes and Gutters	25
Ropes, Twine, and Flax	4
Sewer Pipes, Plaster, &c.	32
Shovels, Spades, &c.	21A
Signal Wire Pulleys	11
Soft Goods	8
Sponge Cloths	5
Screws and Split Pins	14
Tin-plates	22
Varnishes	1
Waste	5A
Water-proof Clothing	9B
Wicks	5
Wire, Fence and Signal	30A
Wirework	30B

Forms of Tender can be obtained on payment of 6d. each from the Company's Storekeeper, at the General Stores, Inchicore, Dublin, to whom inquiries for information should be made direct. Patterns may be inspected at the same place on and after the 29th instant, between the hours of 10 a.m. and 4 p.m. (except on Saturdays).

The Tenders to be sent in endorsed "Tenders for Stores," and addressed to the undersigned, so as to be with him before 10 o'clock a.m. on Wednesday, November 14, 1917.

The Directors will not consider any Tender except those furnished on the Company's forms, and do not bind themselves to accept the lowest or any Tender.

By Order,
ROBERT CRAWFORD,
Secretary.

Kingsbridge Terminus,
Dublin,
October, 1917.

POSITIONS VACANT.

FOREMAN PLATELAYER.

Wanted. Working Foreman Platelayer, permanent job.—Apply, giving particulars of experience and wages required, ENGINEER AND MANAGER, Rhondda Tramways Co., Ltd., Porth, Glam.

TRAFFIC INSPECTOR.

The Coventry Corporation Tramways Department require a traffic inspector.

Applicants must have had experience in controlling traffic and the supervision of drivers and conductors, and must be ineligible for military service. Commencing wage, including bonus, 49s. 6d. per week and overtime.

Applications stating age and experience with copies of testimonials to be addressed to T. R. WHITEHEAD, General Manager, Priestley's Bridge Depot, Coventry.

CHARGE ENGINEER.

Charge Engineer required for Tramways Sub-Station, shift duties averaging 56 hours a week. Wages 50s. a week, rising to 60s.; war bonus 2s. 6d. a week. Applicants must have a thorough knowledge of sub-station plant and operation. Apply by letter, giving particulars of previous experience and position with regard to military service, to the General Manager, London County Council Tramways, 62, Finsbury Pavement, E.C.2.

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THE GENERAL SEATING COMPANY, LTD.

13, CITY ROAD, LONDON, E.C.

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

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SATURDAY, OCTOBER 27, 1917.

WAR-TIME TRANSPORT BY TRAMWAYS.

FOR something like twenty years the subject of carrying goods on tramways has been discussed by British tramway authorities, but in proportion to the field which is open not much has been done. Here and there we have successful examples of such work, as in the cases of the Black Country and Leeds. At the recent conference of the Municipal Tramways Association some reference was made to the large mineral traffic now passing over part of the Leeds tramways and over a special line built for the purpose and connected with them. The desirability of developing goods traffic has indeed been admitted at more than one tramway conference; and from the standpoint of national advantage it can only be deeply regretted that no real effort was made before the war to carry out many vaguely-suggested schemes for utilising tramways in connection with manufacturing establishments. What immense service such installations could now be giving is indicated by some particulars given by Mr. C. J. Spencer, the general manager of Bradford Corporation Tramways, in his annual report, which has just been issued. Pressed, as in so many other places, for means of transport, the Ministry of Munitions, together with a local electric manufacturing company (now engaged entirely on munitions of war), asked assistance from Bradford Corporation in the transporting of material from railway sidings to the company's works. The Corporation accordingly constructed a tramway line for the purpose, the total amount of track necessary being 1 mile 87 yards. The line is carried into the company's works, so that material can be transported to the most advantageous place with the minimum of handling. Two tip wagons, four flat trucks, and one special truck are employed, most of which were already in possession of the tramway department for permanent-way work. The hauling is done by an electric tractor which was designed and constructed by the tramway works staff. The scheme is reported to be working very successfully. One main point to be observed is that the tramway runs right into the works where the goods are to be delivered. If traffic of the kind is to be largely developed on our tramway systems it is highly desirable, if not absolutely essential, that there should be sidings into works. This, of course, is one of the difficulties; but manufacturers must be shown the advantages to be gained. At present capital, labour, and material are not easily available, so that the construction of sidings must—except, possibly, for munition works—be left till after the war. Meantime, efforts, where possible, might be made to develop short-haul goods traffic without sidings, and matters might be put in train to be ready for post-war development. A great field will be open, and light railway extensions of tramways could do much for industry, as well as relieve the roads from much of the wear and tear caused by heavy automobile road vehicles.

EMPLOYEES' DEMANDS.

An important point which has been decided by the arbitrator on the claims of the employees of the tramways undertakings in Lancashire, makes the recent award more favourable to the former than it appeared at first. The award was 12s. for male employees and 9s. for women. The arbitrator was appealed to on the point whether the award covers a working week of six days or the whole of the week, and he has decided that a working week consists of six days or shifts, and that if an employee works seven days he is entitled to an extra amount. Most of them work seven shifts a week, and therefore they will receive an award of 14s. a week in most cases, and in some instances 15s. instead of 12s. a week, as was at first contemplated by the corporations, companies, and employees.

The Committee on Production sat at their offices, Old Palace Yard, Westminster, on October 18, to hear the application made for increased war bonuses to the London General Omnibus Company and the London electric tramway companies by the London and Provincial Union of Licensed Vehicle Workers on behalf of the employees of those undertakings. Sir David Harrel presided, and the other members of the Committee present were Mr. J. C. White and Mr. Mosses. The union asked for 10s. a week extra bonus for adults and 5s. a week for boys. Mr. H. E. Blain, Mr. J. Devonshire, and Mr. Shave represented the companies. Evidence was heard on both sides, and the chairman announced that the decision of the committee would be communicated to the parties.

The Committee on Production has made the following award in the case of the Potteries Electric Traction Company:—(1) In the case of male employees the war bonus and the war wage advances to be cancelled, and in lieu thereof there is to be paid a war wage advance of 12s. per full ordinary week as from the first full pay in September. (2) In the case of female employees the war bonus and war wage advances to be cancelled, and women to be paid a war wage advance of 9s. per full ordinary week.

Huddersfield Corporation have adopted a recommendation by the Tramways Committee to increase the war bonus to adult male employees from 10s. per week to 14s., and to female employees and boys from 4s. 6d. and 5s. respectively to 6s. 6d. and 7s. 6d., with certain conditions as to overtime. Coachmakers' wages have been increased to 11½d. per hour, the union rate.

Having regard to the advances which were recently given to the employees, Belfast Tramways and Electricity Committee have declined to grant an application for a minimum wage of 50s. for all adults of the electricity department now earning 40s. per week and over.

The wages of the employees in the Glasgow Corporation tramways department have been increased on terms similar to the findings of the Committee on Production of March 1 and July 14.

STRIKE AT BRISTOL.

Great inconvenience was caused in Bristol on the evening of October 21 by a cessation of tramway, motor omnibus and cab services. This was due to a strike of drivers and conductors, who claimed higher pay and a redress of certain grievances, and demanded full recognition of their right to join a union. These services all belong to the Bristol Tramways and Carriage Company. It appeared that many of the tramway employees had lately joined a union. The men allege that there were other than the reasons officially given why certain employees who were active in union work had been dismissed. The non-union employees maintained a partial service, and on succeeding days the company had a full service of cars and omnibuses for the workers at munitions and other factories. The strikers announced their grievances as follows:—(1) Bristol Tramways and Carriage Company's non-recognition of the union. (2) Refusal to pay 20s. increased wages over pre-war rates. (3) Refusal to concede amelioration of working conditions. (4) No concession for overtime, Sunday, and holiday rates. (5) Refusal to concede to females reduction in the hours of night-work duty, and thus enable them to get home at a reasonable time instead of as at present—1 and 2 a.m. The company replied denying that

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any friction has arisen because of membership of a union, and stating that in September last arrangements were brought into force under which committees were elected to act for the various sections of employees in bringing before the company matters calculated to promote the welfare of the former. As to point No. 2 in the strikers' statement, the company have given the drivers 16s. increased remuneration over pre-war rates, and the management deny that No. 5 represents the position as regards the women employees. Their late duty turn ends between 12.30 and 1 a.m. and it is feared that a public outcry would follow a proposal to stop the services earlier than at present.

INCREASED RECEIPTS AND MILEAGE.

In presenting to Liverpool Tramways and Electricity Committee a review of the past nine months' working of the two undertakings, Alderman E. Russell Taylor, the chairman, said that 9,868,437 more passengers (an increase of 36 millions over pre-war times) had been carried, and, although the decrease in car mileage was 90,303 miles, the receipts showed an increase of £53,417 over those for the first nine months of 1916. The following are the figures for the two periods :—

	Receipts.	Passengers.	Mileage.	Earnings per car mile
	£			s. d.
1917 ..	603,317	127,419,194	9,414,628	1 3·43
1916 ..	549,900	117,550,757	9,504,931	1 1·88

Despite every effort, considerable congestion took place. It was impossible under existing conditions to provide additional cars. According to Mr. C. W. Mallins, general manager, the congestion was not so much brought about by a depletion of the service as by the enormous increase in passengers. The committee on February 16 approved a report of the general manager recommending a series of inner circular routes, making the Old Haymarket the general terminus. The object was to obviate congestion, particularly in the central area, and also to reduce the car miles at the end of the journey. Three of the routes were in operation, and had proved eminently successful financially and in obviating congestion.

Leeds Tramways receipts during the half-year ended September 30 were £296,867—a record figure, and an increase of £28,846 upon the corresponding period last year, the percentage being 10·763. Earnings per car mile reached 14·618d., an increase of 1·529d., or 11·681 per cent. The number of passengers was 61,723,986 (increase 4,565,347 or 7·987 per cent.). The total population which the system serves (542,000 in number) was carried 113 times. The number of cars in use was 238, as against 235 (the latter number being the lowest for many years), but this does not necessarily mean that 238 were in constant use. The total car miles were 4,873,829. Working expenses were £150,190, or 50·6 of the gross receipts, an increase of £22,000. It is expected that £55,000 will go to the relief of the rates, and £24,000 is required for deferred permanent-way renewals.

In the Bradford general manager's report upon the past half-year a decrease of 107,000 is shown in mileage on the corresponding period, while the receipts were £203,590 (increase £19,000). The passengers numbered 42,893,000, an increase of 2,745,000. This is an average of 127 journeys per head of the population, an average of 16 more than for the same period last year.

REVISION OF FARES.

LEEDS PROPOSAL TO SUSPEND THE HALFPENNY FARE.

The traffic sub-committee of Leeds Corporation Tramways propose, as a war measure, the temporary abolition of halfpenny fares on the cars, without altering, however, the existing stages. These will remain as at present, and passengers will still be able to travel the same distance for three-halfpence, etc. The reasons of the sub-committee (of which Mr. J. Stringer Hinchliffe is chairman) for proposing the alteration are on account of the service being so congested and the fact that it cannot be accelerated, together with the idea of eliminating the passengers who crowd into the cars in the centre of the city and only travel the first halfpenny stage, while the long-distance passengers are compelled either to walk or to wait for other cars. No change is contemplated with regard to children's fares, but a slight alteration is suggested in workmen's tickets. Under present conditions workmen can travel over two halfpenny stages, if they are within a mile of the centre of the city, for a halfpenny, but under the new scheme they will have to pay a penny for a return ticket, which means that if they make the return journey they will still get the same advantage as at present. One result of the proposed abolition will be to free the cars from crowding on the first halfpenny stage from the centre of the city. It is not uncommon for long distance passengers to walk to the end of the first halfpenny stage in order to get a better chance of a seat.

There is every probability of an increase in the Manchester fares at an early date. Preliminary steps in this direction were taken at the Tramway Committee meeting on October 23, when the chairman (Alderman Bowes) moved the rescinding of a resolution passed a few months ago that no fares be increased until the Special Trading, Profits Committee of the City Council had presented their report. The motion was, however, not carried.

In his report for the past year Mr. C. J. Spencer, general manager. Bradford Corporation Tramways, says : " If commodities and rates of pay remain at their present high level, the question of raising fares may have to be considered in the future."

MOTOR WAGONS TO RELIEVE RAILWAYS.

In connection with the scheme initiated by the Ministry of Munitions for the use of commercial motor vehicles in order to relieve the pressure on the railways, the Sheffield and Manchester Chambers of Commerce have started a service between those cities. For some years past motor vehicles have been used to a great extent in the cotton traffic between Manchester, Liverpool and other Lancashire towns, and during the past year the Manchester Chamber of Commerce has inaugurated a return load organisation for the purpose of extending this traffic.

For some months the Leeds district office of the Ministry of Munitions has been engaged in encouraging motor transport between various places in Yorkshire and the adjoining counties. In a communication from the Leeds office which was recently received by the Ossett Chamber of Commerce it was stated that if there was a shortage of privately-owned wagons for short distance traffic the question of providing Government vehicles would have to be considered. In the course of the discussion on the Leeds letter, a member stated that his firm had to send goods by rail which could be delivered by their motor wagons if they could obtain a sufficient allowance of petrol. Although the firm could not obtain petrol, yet they could hire motors for the work. Another member remarked that if return loads could be obtained for other people it would be a great benefit to local trade. The Chamber decided to point out to the Ministry of Munitions that at present full use could not be made of motor vehicles on account of the unequal and insufficient petrol supply.

FEDERATION OF BRITISH INDUSTRIES.

Mr. F. Dudley Docker, C.B., presiding at the annual meeting on October 19 of the Federation of British Industries, having alluded to the growth of the Federation, said that they must have progress if they were to be useful. The first step towards stagnation was to have a perpetual president; therefore he declined, though with much personal regret, to be nominated for a second time. The Executive Committee had suggested Sir Richard Vassar Smith, and no better man could be found for the office. The Federation had gradually become the representative organisation of British manufacturers. The question which they must consider was the policy of protecting our trade against foreign aggression. There was no summary solution; they must determine if any duties should be imposed, and they must consult with the Government as to the method by which any tariff could be used as a power to bargain with foreign nations. The question of education lay at the roof of a great many difficulties. If they were to be successful in competition they must provide for the better education of themselves and their workpeople. The Prime Minister had authorised him to say that he would welcome any federation of industry, and expressed the opinion that such an association would be of assistance to the Government. They must obtain some recognition and status in the eye of the law that would place them in as favourable a position as trade unions now occupy. Sir Richard Vassar Smith was elected president of the Federation for the ensuing year, and the following were elected vice-presidents :—Mr. Dudley Docker, Lord Aberconway, Sir Vincent Caillard, Mr. A. H. Dixon, Sir Algernon Firth, Sir Robert Hadfield, and Mr. W. P. Rylands.

MISCELLANEOUS NEWS AND NOTES.

Trailers at Blackpool.—It has been decided to ask the Board of Trade for permission to run trail cars, owing to the depletion of staff.

Increased Lighting of Leeds Cars.—By the permission of the Home Office, an improvement has been effected in the lighting of the Leeds cars by the alteration and removal of some of the shades around the lamps.

British Commercial Gas Association.—The annual meeting will take place on Wednesday, October 31, and will be followed by a conference of experts on the question of coal gas as a substitute for liquid motor fuel now and after the war.

Taxi-cab Fares.—The Home Secretary has made an order authorising the increase of fares for taxi-cabs in the London district by the addition of 6d. for each hiring. The order will come into force on November 1, and continue until the termination of the war.

Electric Tramways for Derry.—A member of the Corporation having declined to negotiate for the sale of a plot of land as a site for buildings in connection with the proposed electric tramway service, the Council have included a clause to acquire the land compulsorily in the Bill being promoted in Parliament.

Settlement of Railway Trouble at Derby.—A large number of men employed in the Midland Railway shops at Derby ceased work on Tuesday, owing to a dispute between the members of the National Union of Railway Men and the Boilermakers' Society. On Thursday night a settlement was reached, and work was resumed yesterday.

Increase of Rolling Stock at Blackpool.—The Blackpool Tramways Committee have approved an increase of the rolling stock as soon as the Minister of Munitions permits. Mr. Charles Furness intends to increase the number of cars as early as possible to 100, and this will involve obtaining 16 additional cars.

Fares at Keighley.—The increased fares at Keighley are having a satisfactory result on the revenue. When the uniform penny fare was sanctioned, it was estimated that the increased yield would amount to about £600 a year. From July to September, however, the actual increase in revenue was £904.

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Seventy Fares in Four Minutes.—A Hull correspondent states that a woman conductor collects seventy fares before her car reaches the first stage of its journey, and that the time occupied between starting and reaching the stage is a little under four minutes.

Wigan to Wharfedale by Tramway.—A traveller has journeyed from Wigan to Wharfedale on nine different tramways and in fifteen different cars. The outward journey cost 3s. 7d., including a ride in a Todmorden motor omnibus. The return journey cost less, as he was in time to ride at workmen's fares. Contrasted with the fares that he would have paid on the railways, the passenger saved about five shillings.

The Petroleum Bill.—On the Petroleum Production Bill on Thursday night the Government was defeated by a vote of 44 against 35 in favour of an amendment to strike out the provision for payment of a Royalty of 9d. on every ton of petroleum raised under the powers conferred by the Bill. It was contended that the Crown had a right to any petroleum which might be found without having to pay royalties to the owner of the land.

High Cost of Materials.—In his report for the past year, Mr. Frank Ayton, Manager of the Ipswich Corporation Tramways, cites the following examples of the increased cost of materials:—lubricating grease, 89 per cent.; oil for cars, 123 per cent.; steel tires, 255 per cent.; armature coils, 89 per cent.; copper trolley wire, 110 per cent.; stranded steel wire, galvanised, 60 per cent.; and steel check rail bar, 120 per cent.

Permanent Way at Sheffield.—In his report for the year ended March 25, 1917, Mr. W. J. Hadfield, city surveyor, states that the expenditure on tramway permanent way was £23,015, a decrease of £3,040 as compared with the previous year. Several junctions were replaced and 7,064 joints were welded. In addition, 412 joints and 10 points and crossings were repaired by electrically welding steel to the surface of the worn rail ends.

Interfering with a Switch.—The Sunderland bench fined an electrical engineer 40s. for having knocked a switch to an off position because he and his wife wanted to get off the car and the conductor had not waited until they got downstairs. It was stated that the practice was becoming common and it might have serious consequences on an incline or when anything was in front of the car, as the motorman would have only the hand b ake left to control it.

Increased Expenses at Warrington.—Alderman Wilkinson at a recent Council meeting discussed the position of the tramway undertaking, and said that while the tramways had held their own without increasing prices until now, the straining point had come. War bonuses had increased to £3,600 per annum. Prior to 1914 the cost per car mile was 8d.; to-day it amounted to 11½d. per car mile. On the omnibuses they had been losing money all along. Unless additional revenue was obtained, the deficit would have to be met out of the rates.

Steel Gas Containers Discouraged.—In reply to an enquiry from the Automobile Association, the Minister of Munitions has stated that so long as gas for motor vehicles is conveyed in bags at or slightly above atmospheric pressure, and not compressed in steel cylinders, it is not considered that there is at present any need to restrict the use of coal gas. At the same time if motorists were to use coal gas on any considerable scale it might, in the interests of national requirements, become necessary at some future time to impose restrictions.

Coal Gas for Commmercial Motors.—The Commercial Motor Users' Association (83, Pall Mall, S.W.1), which has for some time advocated the use of ordinary coal gas for commercial motor vehicles, has appointed a Special Committee to follow developments in the use of this fuel. The Association will shortly issue a list of stations throughout the country where charging facilities are obtainable, and would be glad to receive particulars of any such stations giving particulars as to hours during which containers can be re-charged, price of gas per 100 cubic feet, and diameter of connection. Mr. F. G. Bristow, Secretary, will be pleased to place the information in his possession at the disposal of any firm who, through insufficient petrol supplies, are desirous of utilising this new fuel.

Compensation to Dublin Tramway Company.—Mr. Duke, repyling to a question in the House of Commons on October 25 by Mr. Nugent, said that the sum of £1,820 5s. 6d. had been paid to the Dublin United Tramways Company in respect of material damage during the rebellion to their property, including buildings, their contents, wiring, pillars, and permanent-way. The Property Losses Committee was precluded by its reference from entertaining claims for loss of wages of employees, and there were no funds at the disposal of the Irish Government for making such claims. The only tribunal competent to consider a claim of this character was the Defence of the Realm Losses Committee, and he understood that it would shortly hear a claim which was regarded as a test case.

Munitions Tramway at Bradford.—At the request of the Ministry of Munitions for assistance in transporting material from railway sidings to works engaged in the manufacture of munitions, the Bradford tramways during the past year constructed a tramway which, including sidings, comprises 1 mile 87 yards of track. An electric tractor is used to haul trucks over the railway sidings. The munitions track is of the usual tramway gauge, and has been carried into the works so that the material can be transported to the most advantageous place with the minimum of handling. Some of the existing tramway rolling stock has been utilised, namely, two tippler wagons and two flat trucks, previously used for the conveyance of permanent way material. Additional flat trucks have been constructed, and one special truck for the purpose of carrying aeroplane parts. The whole of the work was carried out by the regular tramway staff, and the arrangements have worked very satisfactorily.

New Transport Arrangements.—It is reported that a new co-ordination scheme for the saving of petrol, horses and labour will come into force on December 1. Joy riding has been stopped and waste transport is to be stopped also. Wholesale traders will be required to make returns of their average distribution of supplies, and to make arrangements for transport from the nearest sources. The idea is to reduce to the utmost all transport. There are undoubtedly great possibilities in the scheme. Tramways should be utilised to a much greater extent in the carrying of parcels.

Portsmouth and Women Drivers.—Having lost 71 per cent. of their motormen to the Services, the management of Portsmouth Tramways have had to restrict the car service. Only a few of the former employees have yet been discharged from the army unfit for further service. These are not in a condition to return to their original occupations, and are being kept on at other work in the department. A last effort is now to be made to secure men who can be trained as motormen, and if it proves unsuccessful the Tramways Committee contemplate employing women as drivers.

Metropolitan Association of Electric Tramways Managers.—A meeting of the members of this association was held at the Municipal and County Club, Whitehall Court, Whitehall, S.W., on Friday, October 19, when there were present:—Messrs. Ullmann (East Ham), Harvey (Ilford), Hammond (Metropolitan Electric Tramways), Williams (Erith), Stokes (Bexley), Mason (South Metropolitan), Mackinnon (London United Tramways), and Goodyer (Croydon). Messrs. Ullmann, Hammond and Goodyer were respectively re-elected chairman, vice-chairman and secretary. A number of items on the agenda had to be left over for discussion.

Engineer Training.—A large and representative meeting of engineers and educationists was held on Thursday at the Institution of Civil Engineers, when the need for more improvement in engineering training was discussed, and a resolution was passed that a representative committee should be appointed to initiate means to carry out the principle of a central organisation for the purpose. Sir Maurice Fitzmaurice, who presided, said that a full supply of young engineers was essential to recruit the ranks. Professor W. E. Dalby said that ten years ago when he was in Germany the number of men soundly educated and trained in engineering was more than ten times that in England. This constituted a strong menace then, and it was greater now.

Increasing Strain on the Railways.—Mr. Wardle, Parliamentary secretary to the Board of Trade, stated on October 19 that the difficulties of the railway companies are much more severe than they were at the beginning of the year. Many more than 500 locomotives have been sent abroad for the purposes of the war, and some thousands of locomotives are waiting repairs which cannot be undertaken owing to the shortage of materials and labour. Over 160,000 men have been released by the railway companies for military service, yet a greatly increased traffic is now dealt with by the companies. The Board of Trade desire to urge upon the public the absolute necessity of reducing to the utmost the calls on the railway companies for the conveyance of passengers and goods. The ever-increasing demands on the railways may make further restrictions necessary.

New Petrol Regulations.—Under a new Motor Spirit Restriction Order which comes into operation on November 1, the use of motor vehicles in connection with such sports as hunting, shooting, and golfing, or for any purpose which cannot be justified on the ground of absolute necessity, will be no longer permissible. The Petrol Controller says that there is reason to believe that some persons are illegitimately using spirit obtained under free-of-duty licences issued to commercial vehicles, agricultural machinery, etc. Another abuse, he declares, is the acquisition of spirit under the name of petrol substitutes, without corresponding entries on motor spirit licences as provided by the regulations. Vehicles enrolled for war service are exempt from the restrictions only while actually employed on such service. A representative of the Petrol Control Board has stated that the responsibility of framing prosecutions rests with the Customs authority. Anyone who is challenged will have to show that he or she is using the car in accordance with the regulations. A statement was issued on October 17, to the effect that the police have received instructions to enforce the new regulations, and to stop any car for that purpose.

PERSONAL.

Councillor A. M. Jarmin, who has accepted the mayoralty of Ipswich for the ensuing year, has done much useful work as chairman of the Tramways Committee.

Sir Boverton Redwood, director of petroleum research, has been appointed director of technical investigation in the recently created Petroleum Executive.

Mr. Henry Clayton has been recommended by Preston Corporation Tramways Committee for appointment as assistant-engineer and manager at a salary of £200 a year.

Alderman J. H. Hargreaves, who for many years, until a year or so ago, rendered great service to the Hull Corporation Tramways as chairman of the committee, was on October 22 presented by the citizens with his portrait as an expression of their respect and esteem. The alderman was the first Lord Mayor of Hull, which position he occupied for three years, resigning his chairmanship of the Tramways Committee in the third year owing to the strain entailed on the mayoral duties by war work. The fund for the presentation amounted to about £800, and the ex-Lord Mayor was also handed an ebony walking stick, gold mounted, and bearing the city arms. Mrs. Hargreaves received a diamond ornament.

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Mr. William B. Worthington, owing to ill-health, has resigned his position as chief engineer to the Midland Railway Company.

Mr. James Briggs, assistant engineer of the Midland Railway Company, has been appointed chief engineer to the company, in succession to Mr. W. B. Worthington, retired owing to ill-health.

The late Alderman J. Brodie.—Mr. Charles Furness, general manager of Blackpool Corporation Tramways, in his report for the past year, alludes to the late Alderman Brodie, and states that he occupied the position of chairman of the Tramways and Electricity Committee uninterruptedly from 1896 to his death, and during this time played a prominent part in the administration of these departments. He was exceedingly proud of his long association with these undertakings, and their prosperity and present success is to a large degree due to the staunch support the officials always received from him. His genial presence and broad humour will be sadly missed.

FINANCIAL REPORTS AND MEETINGS.

Straker-Squire, Ltd., have declared an interim dividend of 1s. per share.

Babcock and Wilcox, Ltd.—An interim dividend of 6 per cent. is announced, the same as a year ago.

Brisbane Electric Tramways Investment Company.—An interim dividend has been declared on the ordinary shares for the half-year at the rate of 8 per cent. per annum (4s. per share) free of tax.

Parent Tyre Company.—The board recommend a dividend of 11 per cent. on deferred shares for the past year. The deferred shares received 7 per cent. for 1915-16, 7½ per cent. for each of the two preceding years, and 5 per cent. for 1912-13.

Hurst, Nelson, and Co. Limited. The profits for the year ended July 14 were £78,770, and £14,989 was brought forward. A dividend of 10 per cent., and a bonus of 2½ per cent. is proposed on ordinary shares, free of income tax, adding £20,000 to the reserve, and £18,074 to the depreciation fund.

East Ham Corporation Tramways.—The total revenue for the year amounted to £65,021, and the operating costs were £57,208, showing a gross profit of £7,813. Interest on loans required £4,788, sinking fund and capital repayments, £6,238, leaving a deficit of £3,213, as compared with a profit of £1,952 for the previous year. The total operating costs per car mile were 8·83d., which compared with 7·89d. last year. Power costs at 1·70d. have slightly increased. The total revenue per car mile was 10·04d., which compares with 9·87d. in the previous year.

Blackpool Corporation Tramways.—In his report for the year ended March 31, 1917, Mr. Charles Furness, borough electrical engineer and tramways manager, states that the total income amounted to £96,224, and the working expenses to £55,085, leaving a gross profit of £41,139, which has been allocated as follows:—interest and sinking fund charges, £19,956; reserve fund, £2,183; permanent way renewal fund, £9,000, leaving a surplus of £10,000, which has been paid in aid of rates. The sum so contributed is equivalent to 24·3 per cent. of the gross profit. After providing for interest and sinking fund charges, the available surplus represents 6·67 per cent. on the capital outlay. Total receipts show an increase of 20·2 per cent.; working expenses, 22·3 per cent.; gross profit, 17·4 per cent.; and net surplus, 30·2 per cent. Passengers carried amounted to 3,224,687, or 22·1 per cent. more than in the previous year. The revenue is the highest in the history of the department, but the net profit is only the second best, falling short of the 1914 record by £3,300. Referring to expenditure on the permanent way, Mr. Furness remarks that too much emphasis cannot be laid on the necessity of building up a very substantial fund for future permanent way work, as extensive renewals cannot be carried out under present circumstances or probably for some time to come.

Bradford Corporation Tramways.—In his nineteenth annual report, Mr. C. J. Spencer, general manager of the Bradford Corporation tramways, remarks that although the difficulties of operation have been increased owing to the restricted lighting of the cars and streets, the replacement of employees who have left to take up military duties, and the limited supply of material, a considerably larger number of passengers has been carried. The drain upon the staff has been met in the main by the employment of women. The expenses show an increase of £8,816, and the allowances to dependants of employees has increased by £6,013 to £14,351. The total revenue for the year ended March 21, 1917, amounted to £356,025, and the working expenses to £267,460, leaving a gross profit of £88,565, an increase of £1,893 over last year. After payment of interest and sinking fund and other charges, and allowances for reserves and renewals, a sum of £3,400 has been appropriated to the city funds in relief of rates. The appropriation in the previous year was £25,000. The traffic revenue, excluding the railless system, amounted to £326,406 against £314,486 last year, an increase of £11,920. Although there was a decrease in the car mileage of 148,210, or 2·5 per cent., the revenue increased 3·79 per cent., raising the receipts per car mile from 12·842d. last year to 13·674d. The cost of labour has risen to 58 per cent. of the total expenditure. The effect of the restricted staff and the difficulty of procuring material is shown by the decrease of £9,344 in the cost of repairs to cars. Mr. Spencer remarks that if commodities and rates of pay remain at their present high level, the question of raising fares will have to be considered in the future. Large sums of money will be required to restore the undertaking to its pre-war level, and the manager impresses upon the Committee the necessity of building up the reserve funds to meet the inevitable position after the war.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended October 24 amounted to £53,836, an increase of £6,820 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to October 24 (twenty-nine and a half weeks) the total receipts were £1,651,816, an increase of £204,437 on the corresponding period of 1916.

Ipswich Corporation Tramways.—In his annual report for the year ended March 31, 1917, Mr. Frank Ayton, chief engineer and manager, states that the expenditure, including capital charges, amounted to £31,672, entailing a loss on the year's working, after making provision for a sum of £672 for allowances to employees serving with the Forces, of £2,672. This loss is largely due to the restricted hours of running in the evening, and to the reduction in the number of soldiers carried during the greater part of the period. The working expenses were £2,743 higher, in spite of the decrease in mileage. The percentage of working expenses increased from 67·80 per cent. to 77·50 per cent. The average working expenses, including power cost, were 9·271d. per car mile, which compares with 7·422d. in the previous year.

Dick, Kerr and Company, Ltd.—The report for the twelve months ended June 30, 1917, shows that the company has again had a very prosperous year. A dividend of 10 per cent. per annum is recommended on the ordinary shares and £36,073 is carried forward. A year ago the dividend was 6 per cent. and £20,397 was carried forward. As a year ago, a special reserve of £25,000 has been made for contingencies. The profits amounted to £95,465, and including the amount brought forward there is a total sum available of £115,862, which has been allocated as set out in the table below.

	1917.	1916.	1915.	1914.	1913.
	£	£	£	£	£
Net profits	95,465	71,740	46,959	44,761	30,092
Balance from last year	20,397	18,347	25,526	10,325	10,016
	115,862	90,087	72,485	55,086	40,108
Debenture interest and trustees' fees ..	10,188	10,490	10,538	10,961	11,183
Premium on debenture stock redeemed ..	300	300	300	300	300
Dividend on 6 per cent. preference shares ..	18,300	18,300	18,300	18,300	18,300
Dividend on ordinary shares ..	26,000 (10%)	15,600 (6%)	—	—	—
Reserve against contingencies	25,000	25,000	25,000	—	—
Balance carried forward	36,073	20,397	18,346	25,525	10,325

Although the amount of excess profit levy under the Munitions of War Act has not been finally settled, the directors believe that the reserves which they have made in the accounts for extra depreciation, special taxations, etc., are sufficient. The work carried out during the year by all departments on behalf of the Government has been of even greater magnitude than in any preceding year. The national factory, to which reference was made in the previous report, has been completed and organised and was handed over to the Government as a going concern in July last thus releasing a large number of the company's staff for development work in other directions. The company has acquired control of the United Electric Car Company's undertaking by the purchase of the greater part of the issued preference and ordinary shares in that company. Steps have been taken to amend the articles of association of the Car Company so as to enable Dick, Kerr and Company, Ltd., to retain control so long as it continues to hold the ordinary shares. The directors therefore intend to dispose of the preference shares so as to replace the capital of the company temporarily invested therein. Before offering the shares for sale elsewhere, the directors invite applications from share and debenture holders of Dick, Kerr

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and Company, Ltd., for the purchase of these preference shares at par. The capital of the United Electric Car Company consists of £100,000 in 7 per cent. cumulative preference shares of £1 each, and £150,000 in ordinary shares of £1 each, making a total of £250,000 issued share capital. No debenture stock has been issued. The works of the Car Company are situated at Preston, adjoining the works of Dick, Kerr and Company, and can be very conveniently operated under one management. The output will be sold through Dick, Kerr and Company's selling organisation, and it is expected that a considerable increase in business and reduction in expenses will result.

CONTRACTS AND ORDERS.

The Stirling Boiler Company are supplying boiler equipment to Wolverhampton Corporation at £19,822.

The Ocean Accident and Guarantee Corporation have agreed to insure four additional Austin wagons belonging to Marylebone Council against all risks at an annual premium of £12 each, less 15 per cent.

Gas Containers have been purchased for four motor omnibuses belonging to Walsall Tramways Committee, at £23 8s. each. The order followed the carrying out of a trial run in an omnibus belonging to the Corporation.

Southend Corporation have obtained a "B" priority certificate in lieu of the "C" certificate originally allowed by the Ministry of Munitions for four battery vehicles ordered from Messrs. Ransome, Sims, and Jefferies, of Ipswich.

Wolverhampton Corporation have placed the following orders:—British Thomson-Houston Company, Ltd., for a 5,000 kw. turbo-generator at £17,803; Allen and Company, for a condenser body at £6,083; Willans and Robinson, Ltd., for condenser plant auxiliaries, at £3,729.

Ferranti Ltd., have received orders from Birmingham Corporation for seven 1,250 k.v.a. single-phase transformers, from Glasgow for sixteen 1,875 k.v.a. single-phase transformers, from Manchester for a 125 k.v.a. three-phase transformer, and from the British Thomson-Houston Company for a 1,650 k.v.a. three-phase transformer for use with a rotary converter.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-nine of the principal tramway undertakings in the United Kingdom for the week ended October 13 give total receipts of £195,486 or £20,147 more than in the corresponding week of last year. The total length of track included in the returns was 2,058 miles.

The receipts this year were at the rate of £94 19s. 9d. per mile of single track, and last year at the rate of £85 3s. 11d., thus showing an increase for the week of £9 15s. 10d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and Padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

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CHAPTER XIII.—RECONSTRUCTION.
Removal of tracks—Temporary tracks.

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DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH, OCT. 25, or previous	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	72	71½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4½	60/-	6½/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	70½	69½
4½%	4½%	Do. 4½% Deb.	100	98½	73½	73½
5%	5%	Do. 5% Deb.	100	96	68	67½
—	—	Associated Omnibus Co., Ord. ..	5/-		1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	104	104
—	1/-	Bath Electric Trams Pref. Ord.	1	½	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1		10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	71½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11½	9½	9½
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	44½	44½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	90½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91½	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27	27½
6%	5%	Do. Pref. Ord.	100	106	28	28½
5%	5%	Do. 5% Cum. Pref. ..	100	103	40	41
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	83	84½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	51½	50½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	28½	28
6%	6%	Do. 6% Cum. Part. Pref.	100	—	72½	73
5%	5%	Do. 5% Deb.	100	92	75	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
3/-	6/6*	Calcutta Tramways Ord. ..	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref. ..	5	5½	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71½	71½
1/-*	1/-*	Cape Elec. Trams.	1	1	11/-	11/-
1/3	1/3	City of B. A. Trams	5	5½	82/6	85/-
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82½	82½
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10½	10½
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	½	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum Pref. ..	1	½	10/-	10/-
4½%	4½%	Do. 4½% Db	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-		17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9½	9½
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9½d.*	9½d.*	Llandudno & Colwyn B. Ord. ..	1	—	15/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	½	1/9	1/9
6d.	6d.	Do. 5% Pref.	1	½	6/3	5/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61½	61½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81	81
5%	5%	Do. 5% Inc. Deb.	100	88½	78	78
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	32½	32½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5½	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9½d.*	Manaos Trams & Ltg. Ord. ..	1	½	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light .	$100	102	67	66
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
—	—	Mexico Trams. Common ..	$100	70	33½	33
—	—	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	38½	38½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	92½	92½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/9½*	2/-	National Steam Car	1	½	19/6	20/-
9½d.*	9½d.*	New General Traction	1	½	7/3	7/3
8½d.	9d.	Northern Gen. Trans. Ord. ..	1	½	13/-	13/-
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	81/3	81/3
5%	5%	Do. 5% 1st Deb.	100	89½	76	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/6	7/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/9	12/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	½	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	½	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	½	19/9	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	78	78
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	90½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74½	74½
8/-	12/-	Shanghai Elec. Cons.	10	13	14½	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	½	4/9	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	67½	67
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	½	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	½	83/9	83/9
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	16	16
—	—	Undgd. Elec. Rys. of London ..	10	21½	38/9	37/6
		Do. "A"	1/-	½	6/3	6/4
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	103½	102½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102½	102½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	84	84½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Wks.	Aggregate. 1917	Incr. or Dec.
Aberdare U.D.C. ..	Oct. 16	395	467	+ 72	27	12,548	+ 1,096
Aberdeen Corporation ..	,, 17	1,769	2,030	+ 261	20	44,344	+ 5,026
Ayr Corporation	,, 20	283	338	+ 55	23	12,811	+ 1,185
Belfast City	,, 19	5,755	6,788	+ 1,033	29	183,984	+ 18,557
Birkenhead Corporation ..	,, 21	1,585	1,811	+ 226	29½	53,784	+ 8,024
Birmingham Corporation ..	,, 13	14,725	18,837	+ 4,112	28	508,968	+ 42,844
do. Motor Omnibuses ..	,, 13	1,058	1,106	+ 48	28	28,574	+ 217
Blackburn Corporation ..	,, 17	1,157	1,387	+ 230	29½	45,160	+ 6,746
Blackpool & Fleetwood ..	,, 20	442	526	+ 83	42	39,841	+ 173
Bournemouth Corporation ..	,, 24	2 033	2,455	+ 422	29½	78,982	+ 5,737
Bradford Corporation ..	,, 20	6,587	9,084	+ 2,497	29	226,744	+ 22,164
Bristol	,, 19	5,014	5,729	+ 715	42	229,007	+ 21,731
Burnley Corporation ..	,, 20	1,707	1,838	+ 131	..	..	..
Burton-on-Trent Cor. ..	,, 21	278	315	+ 37	29	9,027	+ 807
Bury Corporation ..	,, 21	1,372	1,566	+ 192	29½	49,641	+ 5,903
Chatham & District ..	,, 18	1,316	1,210	— 106	42	54,307	+ 2,110
Cork Electric	,, 18	544	567	+ 23	42	23,138	+ 1,503
Derby Corporation ..	,, 20	1,148	1,210	+ 62	29	35,380	+ 1,352
Dublin United	,, 12	6,549	6,777	+ 228	41	275,103	+ 26,274
Dundee City	,, 17	1,347	1,507	+ 160	22½	34,846	+ 3,212
East Ham Corporation ..	,, 20	1,314	1,329	+ 15	29	41,469	+ 2,551
Exeter Corporation ..	,, 19	394	386	— 8	29	12,076	— 69
Glasgow Corporation ..	,, 20	24,246	26,939	+ 2,693	32	538,738	+ 62 230
Glossop (U.E. Sup. Co.) ..	,, 20	140	166	+ 26	42	6,428	+ 577
Halifax Corporation ..	,, 16	2,098	2,309	+ 211	28½	73,182	+ 5,822
do. Motor Buses ..	,, 16	51	53	+ 2	28½	1,398	— 60
Hastings and District ..	,, 21	936	1,155	+ 219	42	53,362	+ 8,075
Huddersfield Corporation ..	,, 20	2,776	3,172	+ 397	29	90,948	+ 9,014
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	Oct. 20	642	728	+ 86	29	22,697	+ 2,287
Ipswich Corporation ..	,, 20	441	658	+ 217	29	20,743	+ 4,651
Isle of Thanet	,, 20	292	206	— 86	3	556	— 416
Kilmarnock Corporation ..	,, 20	176	206	+ 30	22½	4,477	+ 401
Lanarkshire	,, 18	2,289	2,980	+ 691	42	115,955	+ 18,488
Lancashire United ..	,, 17	1,861	2,483	+ 622	42	98,447	+ 21,463
Leeds City	,, 20	9,692	11,023	+ 1,331	29	323,062	+ 32,740
Leicester Corporation ..	,, 20	3,423	3,841	+ 418	..	..	..
Leith Corporation ..	,, 20	858	1,049	+ 191	22½	24,767	+ 4,371
Leyton U.D. Council ..	,, 18	1,538	1,814	+ 276	29	55,652	+ 5,685
Liverpool Corporation ..	,, 20	14,479	15,917	+ 1,438	41½	650,510	+ 58,086
Llandudno & Colwyn Bay ..	,, 12	317	321	+ 4	45½	16,294	— 924
London County Council ..	,, 24	47,016	53,836	+ 6,820	29½	1,651,816	+ 204,437
Maidstone Corporation ..	,, 18	217	229	+ 12	29	7,316	+ 671
Manchester Corporation ..	,, 20	18 648	21,002	+ 2,354	29	600,686	+ 46,139
Nelson Corporation ..	,, 20	197	219	+ 22	29	6,926	+ 531
Newcastle-on-Tyne Cor. ..	,, 20	7.045	8,069	+ 1,024	29	227,666	+ 32,624
New St. Helens & Dist. ..	,, 17	1,041	1,266	+ 225	16	25,001	+ 6,558
Northampton Cor.	,, 19	723	836	+ 113	29	24,375	+ 3,411
Nottingham Corporation ..	,, 18	4,041	4,639	+ 598	29	127,857	+ 12,269
Oldham Corporation	,, 21	2,382	2,690	+ 308	30	86,204	+ 9,711
Portsmouth Corporation ..	,, 20	2,526	2,730	+ 204	..	..	..
Provincial	,, 20	2,251	2,344	+ 93	29½	6,803	+ 320
Reading Corporation ..	,, 18	891	1,088	+ 197	29½	30,630	+ 5,443
Rhondda Tramways	,, 11	1,383	1,557	+ 174	41	61,158	+ 8 542
Rotherham Corporation ..	,, 24	1,618	1,814	+ 196	29½	53,282	+ 7,023
Salford Corporation	,, 22	5,420	6,536	+ 1,116	29½	195,110	+ 31,042
Sheffield Corporation	,, 21	10,656	11,921	+ 1,265	30	359,362	+ 41,216
Southampton Cor.	,, 17	1,726	2,269	+ 542	28½	58 954	+ 9,651
Southend-on-Sea Cor.	,, 10	833	592	+ 241	28	28 847	— 599
South Shields Cor.	,, 13	854	926	+ 72	15	27,042	+ 3,009
Sunderland Corporation ..	,, 21	1,630	1,931	+ 201	29	52,463	+ 4,611
Sunderland District	,, 17	726	854	+ 128	51	36,869	+ 5,145
Swindon Corporation ..	,, 17	205	266	+ 61	29½	7,929	+ 1,914
Torquay Tramways	,, 10	596	753	+ 157	41	28,387	+ 2,192
Tyneside Trys. & Trmrds. ..	,, 3	636	912	+ 275	14	13,341	+ 3,366
Wallasey Corporation ..	,, 20	1,243	1,454	+ 211	29½	47,866	+ 5,556
Walsall Corporation	,, 20	823	1,022	+ 199	29	28,458	+ 3,656
Walthamstow U.D. Coun. ..	,, 20	1,033	1,111	+ 78	29	37,073	+ 3,703
Warrington Corporation ..	,, 4	463	592	+ 129	27	14,491	+ 1,148
West Ham Corporation ..	,, 18	3,271	3,611	+ 340	28½	106,937	+ 11,347
Wigan Corporation	,, 11	1,724	2,001	+ 276	28	54,985	+ 7,404
Yorkshire (West Riding) ..	,, 21	1,757	2,126	+ 369	42	88,903	+ 14,792

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Wks.	Aggregate. 1917	Increase or Dec.
Anglo-Argentine	Oct. 21	£53,160	£53,113	42	£2,164,509	+ £26,100
Auckland .. (28 days)	Sept. 21	20,884	22,154	12	64,876	+ 2,018
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Aug.	7,405,000	8,064,000	34	60,505,000	+ 4,492,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Aug.	423,728	454,425	8	892,803	+ 57,216
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Sept.	23,749	26,168	8	52,882	+ 4,790
Calcutta .. .. Rs.	Oct. 20	65,035	71,493	42	2,874,923	+ 26,792
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Sept.	1,779	4,306	39	38,405	+ 15,806
Cordoba	Aug.	13,851	14,278	22	70,432	— 738
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Sept.	2,523	1,512	9	3,074	— 1,971
Hong Kong .. .. $	Aug. 25	15,115	13,932	34	455,940	— 35,845
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Sept.	3,993	3,450	39	36,545	— 1,076
Lima	May	33,966	35,321	21	181,809	+ 13,098
Lisbon .. .. Escu	Aug.	203,703	246,734	..	..	..
Madras .. .. Rs.	Sept. 30	31,788	34,219	38	624,412	+ 54,626
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	July	152,380	162,157	..	..	..
Montevideo	Sept.	26,711	29,426	48	329,679	+ 10,636
Pernambuco	Oct. 21	3,216	4,259	41	158,976	+ 31,607
Peruvian .. .. $	Sept.	911,910	950,740	13	2,905,170	+ 261,930
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Sept.	4,137	5,163	39	44,354	+ 3,026
Shanghai .. .. $	Aug. 22	21,712	22,369	..	..	..
Singapore .. .. $	Aug. 25	12,352	11,695	34	438,915	+ 13,418
Toronto .. .. $	Aug.	889,241	1,039,819	34	7,867,595	+ 775,323
Winnipeg .. .. $	Aug.	249,795	248,457	34	2,164,624	— 29,338

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

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Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

GREAT NORTH OF SCOTLAND RAILWAY COMPANY.

Contracts for Stores.

The Directors of the Great North of Scotland Railway Company are prepared to receive Tenders for the supply of the undermentioned Stores, for six or twelve months (in the Company's option), from 1st January, 1918:—

	No. of Form.
Brooms, Brushes, &c.	1
Canvas, Ropes, Flax and Twine	2
Carriage Cloth and Trimmings	3
Carriage Furnishings (Locks, Hinges, &c.)	4
Cement and Lime	5
Chamois Skins and Sponges	6
Cotton Waste, Lamp Wick, Sponge Cloths, Flannel, &c.	7
Crucibles	8
Drysalteries	9
Files, Steel and Steel Castings	11
Fireclay, Bricks, Pipes, &c.	12
Galvanised Fencing and Signal Wire and Steel Tail Ropes	13
Glass (Plate and Sheet), Lamp Chimneys, &c.	14
Handles (Hammer, &c.), and Shunting Poles	15
India Rubber Goods, Balata Belting and Engine Packing	16
Bar Iron	17
Iron Castings	18
Ironmongery	19
Leather and Leather Belting	22
Nails, Tacks, Taper Pins, Screws and Cotter Pins	24
Oils, Tallow and Turpentine	25
Soap and Candles	27
Screws (Wood) and Washers	28
Springs (Bearing, Buffing, &c.)	29
Steel Boiler Tubes	30
Steel Tires and Axles for Engines, Carriages and Wagons	31
Transfers (Carriage, &c.)	32
Telegraph Material	32A

Forms of Tenders can be obtained from the Stores Superintendent, **80, Guild Street**, Aberdeen, after 9th proximo, on payment of One Shilling for each form.

Patterns may be inspected at the Stores Depôt, Inverurie, between the hours of 10 a.m. and 4 p.m., from Monday, 12th, to Monday, 19th November, inclusive, except on Saturday, 17th, when they will not be on view after 12 o'clock noon.

Tenders, endorsed "Tender for Stores," must be lodged with the undersigned not later than 10 a.m. on Thursday, 22nd November next.

The Directors do not bind themselves to accept the lowest or any Tender.

T. S. MACKINTOSH,
Secretary.

Company's Offices,
80, Guild Street, Aberdeen.
29th October, 1917.

The Owner of British Patent No. 23,859 of 1911 for "Improvements in Rails, especially Tramway Rails, for preventing the formation of Corrugations," is desirous of arranging by Licence or otherwise, on reasonable terms, the manufacture and commercial development of the invention in this country.—For particulars, address HERBERT HADDAN & Co., Chartered Patent Agents, 31 and 32, Bedford Street, Strand, W.C.2, London.

UNIVERSITY OF DURHAM.

ARMSTRONG COLLEGE,

NEWCASTLE-UPON-TYNE.

Principal: W. H. HADOW, M.A., D.Mus.

Departments of Mechanical, Marine, Civil, and Electrical Engineering, Naval Architecture, Mining, Metallurgy, Agriculture, and of Pure Science, Arts, and Commerce.

Full particulars may be obtained on application to
F. H. PRUEN, M.A., Secretary,
Armstrong College, Newcastle-upon-Tyne.

GREAT SOUTHERN AND WESTERN RAILWAY (IRELAND).

Contracts, 1918.

The Directors of the Great Southern and Western Railway Company are prepared to receive Tenders for the supply of the undermentioned Stores for twelve months to December 31, 1918, or part of that period:—

	No. of Form.
Acid, Sulphuric	3D
Baskets	10
Bolts, Nuts, and Rivets	15
Brooms and Brushes	13
Brass Fittings for Carriages	18
Do. do. for Lamps	18A
Do. do. for Water	26A
Do. do. for Gas	26B
Bunting	7B
Canvas and Sacks	6
Carriage Laces	7A
Castings, Mall. Iron	11
Cement	34
Cloth, Carr. and Uniforms	7C
Clothing Oil	9B
Do., I.R. proofed	9B
Coach Screws and Washers	15
Colours	2
Corks	39
Cotton Waste	5A
Crucibles	41
Curled Hair	7B
Drysalteries	3
Emery and Glass Cloth, &c.	28
Files and Tool Steel	20
Fire-bricks and Clay	33
Foundry Requisites	42
Galvanised Sheets, Buckets, &c.	23
Grates, Stoves, and Fenders	24
Grindstones	28
Glass, Sheet and Plate	27A
Glass and China Sundries	27B
Hardware (Sundry)	17
Incandescent Fittings for Gas	26C
India-rubber Goods	9A
Implements, Sundry	21
Iron Tubes and Fittings	29
Iron and Steel Wire	30A
Leather	12
Linen	8
Linoleum	7B
Locks and Keys	19
Mats, Fibre	10
Morocco	7B
Nails	31
Oak Keys	35A
Oak Trenails	35B
Plumbago	41
Railway Fastenings (Iron)	16
Railway Fastenings (Steel)	16A
Rainwater Pipes and Gutters	25
Ropes, Twine, and Flax	4
Sewer Pipes, Plaster, &c.	32
Shovels, Spades, &c.	21A
Signal Wire Pulleys	11
Soft Goods	8
Sponge Cloths	5
Screws and Split Pins	14
Tin-plates	22
Varnishes	1
Waste	5A
Water-proof Clothing	9B
Wicks	5
Wire, Fence and Signal	30A
Wirework	30B

Forms of Tender can be obtained on payment of 6d. each from the Company's Storekeeper, at the General Stores, Inchicore, Dublin, to whom inquiries for information should be made direct. Patterns may be inspected at the same place on and after the 29th instant, between the hours of 10 a.m. and 4 p.m. (except on Saturdays).

The Tenders to be sent in endorsed "Tenders for Stores," and addressed to the undersigned, so as to be with him before 10 o'clock a.m. on Wednesday, November 14, 1917.

The Directors will not consider any Tender except those furnished on the Company's forms, and do not bind themselves to accept the lowest or any Tender.

By Order,
ROBERT CRAWFORD,
Secretary.

Kingsbridge Terminus,
Dublin,
October, 1917.

POSITIONS VACANT.

FOREMAN PLATELAYER.

Wanted. Working Foreman Platelayer, permanent job.—Apply, giving particulars of experience and wages required, ENGINEER AND MANAGER, Rhondda Tramways Co., Ltd., Porth, Glam.

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Mains Engineer required at once to take charge of Mains and Meter Department of a Certified Undertaking. One having practical knowledge of Tramway Overhead Electrical Equipment preferred. Experience in quick and accurate fault localising essential. Commencing salary £3 per week. Apply, enclosing testimonials and giving full particulars as to age and experience to BOROUGH ELECTRICAL ENGINEER, Lowestoft.

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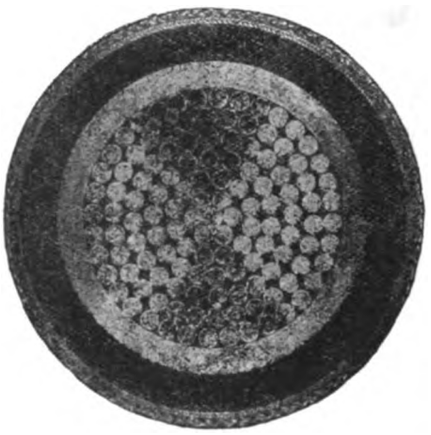

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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The TRAMWAY AND RAILWAY WORLD can be obtained, post free at the following rates :—

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SATURDAY, NOVEMBER 3, 1917.

CO-OPERATION OF MANAGERS AND MEN.

It is now generally admitted that one of the most important proposals ever made from such an influential quarter for the prevention of industrial disputes and strikes is that contained in the report published last summer by what is called the Whitley Committee. That Committee was appointed by the Government, and the kernel of its report is the recommendation for the formation of Joint Standing Industrial Councils in the leading industries. These Councils, composed of representatives of employers and employed, will form courts, before which all grievances can be brought for adjustment and settlement, and where wages can be fixed from time to time. The Government have now expressed their approval of the scheme, and while the various industries will be left perfectly free as to both the appointment and working of the Councils, the latter bodies will be recognised by the Government and consulted as circumstances require. The industries may be induced to take action the more readily in view of the Government's support, and it may be hoped that the trade unions will offer no serious opposition. A trial of the scheme will probably convince them that they will get more out of it in the way of wages than they can by strikes or threats of strikes. So far as tramway undertakings are concerned, the scheme should be quite feasible, though it may be a matter for consideration whether there should be one Council for a district embracing a number of undertakings, or whether each tramway system should have a Council of its own. Sometimes the one and sometimes the other plan might be the better, according to local conditions. An arrangement of the kind is not unknown in this country already, though we believe there is only one example of it. That is the case of Croydon Corporation Tramways. For over a year there have been meetings every two or three weeks between Mr. Goodyer, the manager, and his principal assistants on the one hand and delegates from the various grades of employees on the other. At these staff conferences, as they are called, free discussion takes place over any suggestions or complaints. The procedure has already been found very useful and helpful in the conduct of the undertaking. The scale is small and the time has been short, but the augury is good. A convincing case on a big scale can be cited from America. Prior to the year 1911 the Philadelphia Rapid Transit Company was in constant trouble owing to labour questions, and strikes were frequent. Thousands of men left the service every year, and thousands of others had to be engaged. In the year mentioned, along with a financial reorganisation, a new policy was adopted towards employees. A Committee was appointed, composed of representatives of the men and of the company, and it deals with all matters relating to working conditions, other than questions of policy. A second step was the creation of a wage fund, to which 22 per cent. of the gross earnings is appropriated, and from which operating wages are paid. As the fund increases, wages are advanced. The actual advance in wages of drivers and conductors in five years was about 39 per cent. This may be called a form of profit-sharing, and whether it should be adopted is really a different question from that of constituting Industrial Councils. The latter should come first and pave the way for considering the former. A fixed scheme of profit-sharing might prove quite unnecessary if the Councils do all that is expected from them. It is hardly possible to exaggerate the benefits to be derived from the existence and frequent meetings of such Councils or the subordinate Councils that may be connected with them. Apart even from the question of demands for increased wages which come only occasionally, there are numerous and frequent sources of irritation on minor matters, personal grievances, and so forth, which can be brought before the meetings, ventilated, and settled. Employers and employed will become more acquainted, will understand each other better, and will have opportunities of getting on thoroughly good terms. Freedom and fearlessness of discussion on the part of the men and full liberty to "blow off steam" to their hearts' content would appear to be an essential of the scheme.

WAR OPERATIONS OF THE L.G.O. COMPANY.

At the October meeting, which opened the third session of the "Efficiency Meetings," of the London Underground Railways and the London General Omnibus Company Operating Department Efficiency Meetings, there were about 250 members of the control grades present, the chair being occupied by Mr. H. E. Blain, Operating Manager.

A lecture, "War Time Operations of the London General Omnibus Company, Limited, as seen through the Camera," was delivered by Capt. A. Rosier, Superintendent of Employment and Training. The lecture was extensively illustrated by slides and films, and proved an exceedingly valuable and interesting record of the Company's operations both in conection with the war and at home under the influence of war conditions.

Amongst war pictures were L.G.O.C. single-deck omnibuses equipped as ambulances; with the Naval Division at Antwerp, and Boulogne and in France; conveying regulars, London Scottish, Indians, and wounded; whilst other pictures showed L.G.O.C. lorries practically in all parts of the world, and performing all types of work with the Colours, especially the A.S.C. This portion of the lecture was accompanied by happy little anecdotes of the type frequently read in the War Correspondents' despatches in the earlier days of the war, when so extensive a part in solving the Army's transport problem was being performed by the familiar London bus and the cheery, happy-go-lucky busman, who drove as unconcernedly amongst shot and shell as he did in Piccadilly or the Strand.

The home portion of the lecture included an account of the training of mechanical transport drivers, and concluded with a very excellent new film showing women's work both on the buses and in the garages, coach factories, etc., whilst another portion of the film showed many interesting clerical operations at the Grosvenor Road offices. Two inspections of the L.G.O.C. Special Constabulary, which is 350 strong, and has a motor ambulance attached to it, were also shown.

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DOVER CORPORATION TRAMWAYS ACCIDENT.

REPORT ON THE BOARD OF TRADE INQUIRY.

The Board of Trade issued on October 29 the report of Colonel Pringle on the accident which occurred on the Dover Corporation tramways on August 20 to car No. 20, a single-truck, double-deck car, with accommodation for seating 48 passengers. The car got out of control as it was descending Crabble Hill, and leaving the rails on a curve at the foot of the hill, it crossed the road and overturned. Ten passengers were fatally injured and the fifty-nine other passengers were more or less severely injured. The driver jumped from the platform halfway down the hill and escaped unhurt. From the casualty list it appeared that there were sixty-eight passengers in the car, or twenty more than the seating accommodation. Colonel Pringle considers that the accident was caused by the failure of the driver to cut off power as he approached the compulsory stopping place at the summit of Crabble Hill, and his further failure to utilise properly the sand and brake equipment. Power was not cut off until the trolley left the conductor on the railway bridge. By this time the car had probably already exceeded a speed of 20 miles an hour, and at the critical moment the driver appears to have completely lost his head. In commenting on the accident, Colonel Pringle remarks that men discharged as unfit for military duties on account of nervous breakdown are unlikely to prove suitable as drivers on difficult routes. At all events, medical evidence should be sought before candidates of this description are accepted. The fact must be faced, however, that war has materially reduced safe working conditions on tramways, and it is better policy to close a route like that of Crabble Hill if the number of experienced drivers is insufficient to work it, than to employ men who have not, as a general rule, a year's experience to their credit. Long experience, especially with regard to the use of the rheostatic brake, is necessary to qualify a driver to work traffic in such conditions as the River route. The driver in the Dover accident had only used the brake once previously on service, and his lack of familiarity with it was a contributory cause of the accident. Overcrowding when a car gets out of control on a steep gradient causes a serious list of casualties. If that can be avoided, the list in an accident of this sort is likely to be comparatively small. The liability to overturn on a 3 ft. 6 in. gauge is considerably greater than on the standard gauge. Determining factors on overturning are the actual speed, curvature, super-elevation, height of the centre of gravity and the nature of the road. The more passengers on the top deck, the higher becomes the centre of gravity. Standing passengers add to the shifting character of the load, and increase the instability of the car. The heavy load on the upper deck of the Dover car caused it to overturn when it left the rails at the lower curve. In conclusion, Colonel Pringle recommends (*a*) that only drivers of considerable experience, say twelve months', should be permitted to work traffic on Crabble Hill; (*b*) that men be familiarised with the rheostatic brake by being instructed to use it more frequently; and (*c*) that only single-deck cars be used, or no passengers be permitted to travel on Crabble Hill on the upper deck.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council on Tuesday various reports presented by the Highways Committee were adopted.

The reorganisation scheme of the tramways department provided for the appointment of a time-tables assistant at a salary of £250 a year, rising by annual increments of £12 10s. to £300 a year, and a publicity assistant at a salary of £300 a year, rising by annual increments of £25 to £400 a year. On the recommendation of the Highways Committee, Mr. H. R. Docker, second-class assistant, at present in charge of time-tables work, was appointed to the position of time-tables assistant, at a commencing salary of £262 10s. a year.

The Highways Committee regard the present time inopportune for making a permanent appointment of a publicity assistant, and they recommended that, as a temporary measure, a woman be engaged to assist in the publicity work.

Mr. Henry William Woods, A.M.I.E.E., who is at present senior charge engineer in the service of Manchester Corporation, was appointed a charge shift engineer at Greenwich generating station, at a commencing salary of £250, rising by annual increments of £10 to £300 a year.

Arising from accidents in connection with the tramways, 333 claims have been settled, the costs having amounted to about £3,698. In six other cases actions were brought against the Council, and in three of these a verdict was given against the Council, two resulted in the Council's favour, and one was withdrawn.

Through booking arrangements were renewed with the West Ham Corporation, the East Ham Corporation, and the Leyton Urban District Council.

Applications from various employees in the rolling stock branch for increased remuneration were referred to the Rolling Stock Conciliation Board.

The Committee reported that about 39,441 tons of coal and 90 tons of coke for use at Greenwich generating station had been purchased during the quarter ended September 30, 1917, at a cost of about £68,000.

Expenditure has been sanctioned to an amount not exceeding £50 for the installation, for experimental purposes, of a special apparatus for the welding of conductor tee rails.

Sanction has also been given to the purchase of articles required for tramway maintenance purposes and the execution of small works and repairs, at an estimated cost of £38,923.

MAINTENANCE AND WORKING OF TRAMWAYS.

PROPOSED CONTROL COMMITTEE.

On the invitation of the President of the Board of Trade, a meeting of representatives of the Municipal Tramways Association and of the Tramways and Light Railways Association with representatives of the Board of Trade and of the Ministry of Munitions, was held yesterday (Friday) at the offices of the Board of Trade, Whitehall Gardens, for the purpose of considering the position of tramway undertakings in the matter of shortage of materials and labour, with special reference to the needs of those undertakings which are engaged in conveying persons occupied on work of national importance. Sir Albert Stanley was accompanied by Mr. Kellaway, Parliamentary Secretary to the Ministry of Munitions. The President of the Board of Trade stated that the position of matters was becoming so acute that the Board of Trade and the Ministry of Munitions thought it necessary to appoint some form of control, generally of the nature which has been working so successfully in connection with the railways, so that instead of having two departments, namely the Board of Trade and the Ministry of Munitions, dealing with the subject, it could be attended to by one separate body. He invited the co-operation of the two tramway associations, which was gladly promised, and he said that he would be pleased to get suggestions as to the best methods of carrying out the scheme.

SETTLEMENT OF THE BRISTOL STRIKE.

The full service was resumed on Bristol tramways on Friday, October 26, to the great relief of the public. As the result of conferences between the Lord Mayor of Bristol, the Lord Mayor Elect, and Mr. Reyntiens, a representative of the Chief Industrial Commissioner, an official of the London and Provincial Union of Licensed Vehicle Workers, and the chairman and directors of the Tramways and Carriage Company, terms of agreement were arrived at for the resumption of the tramcar, omnibus and cab services. The agreement was accepted at a meeting of the strikers on October 25, and on the following day the various services were resumed. Appended are the terms of the agreement :—

The present system of employees' committees for the respective tramways, motor and horse departments, of the traffic department shall continue.

A fresh election of those committees to take place forthwith.

All local questions to be put before the Company by the employees' committee concerned, and failing agreement, the latter to be accompanied by a trades union official.

The Company declare themselves willing to receive officials of the London and Provincial Vehicle Workers on questions of principle, or questions affecting all the employees of the traffic department.

The above agreements to apply only to employees of the Company employed in the traffic department.

With the aid of those of the employees who had remained loyal a good service had been maintained before the settlement was reached.

MISCELLANEOUS NEWS AND NOTES.

Dover Town Council has decided to levy a rate of 1s. 6d. to meet compensation claims resulting from the accident on August 20.

Bolton Tramways Committee has authorised the general manager to prepare a scheme for six days' work for all employees in the department.

Birkenhead Car Collections.—During the past twenty-three months, the amount received through collections on the Birkenhead tramcars on behalf of various charities amounted to nearly £4,400.

Newport Light Railway.—The Light Railway Commissioners have recently confirmed the Newport Light Railway Order, 1917, authorising the construction of a light railway in the County Borough of Newport.

Steel Tires for Tramcars.—It is announced in the Journal of the Tramways and Light Railways Association for October that makers of tires for tramcars do not propose to make any alteration in the prices current, which will accordingly hold good until December 31, 1917.

Tramway Men's Holidays.—The recommendation of the Bradford Tramways Committee that the overhead staff in the tramways department should be allowed a fortnight's annual holiday, commencing next year, instead of a week as at present, has been approved by the War Wages Committee, to which it was referred.

Institution of Automobile Engineers.—The meetings of the Scottish centre of this Institution will be held in the Royal Technical College, George Street, Glasgow. An interesting programme has been arranged for the forthcoming session, of which particulars are appended :—October 20, presidential address, by T. C. Pullinger; November 17, "Tractors," by H. P. Saunderson (Saunderson Motor Traction Company); December 15, "The Engineer of the Future," by Professor A. Mellanby, B. Sc.; January 19, 1918, "Steel Castings," by W. Lake; February 16, "Coal Oils," by D. Drummond.

Claim for Negligence in Fall of a Wire.—In the Court of Passage, Liverpool, on October 25, Judge Taylor, gave judgment in an action in which a woman claimed damages for injuries sustained by part of an overhead tramway wire falling. The judge said the mishap happened at a section insulater. For plaintiff, an expert said there was no explanation except that the copper screw had not been tightened, and that, therefore, it had become unscrewed by passing traffic or by vibration. The Corporation expert held that it was wrong to draw that inference, and that one ought to assume that some accident had happened. That no accident of the kind had happened before was extraordinary when one considered the number of years the system had been working. The mishap was not due to negligence, he was satisfied, and he gave judgment for defendants.

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The Institution of Automobile Engineers.—The second ordinary general meeting of the Institution of Automobile Engineers will be held in the Physics Lecture Room, University College, Gower St., W., on Wednesday, November 14, 1917, at 8.0 p.m., when Dr. E. G. Coker will read a paper entitled "Photo Elasticity for Engineers." Dr. Coker will deal with further important researches which he has been making on the demonstration of stresses by means of the polariscope, and for this purpose the principal illustrations will be shown by means of a magic lantern. Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution of Automobile Engineers, 28, Victoria Street, Westminster, S.W.1.

Damages against Wigan Corporation.—Seventeen claims for damages arising out of the accident on the Wigan Corporation tramways on July 26 last year, when a crowded tramcar was overturned and a number of passengers injured, one fatally, came before the registrar at Wigan County Court on October 24. A test case had already been brought in court, when judgment was given in favour of the plaintiff for the full amount, £45, and costs. The Wigan Corporation appealed against the decision, but the judgment of the County Court was upheld. The damages awarded in the seventeen cases amounted in the aggregate to £488 19s. 5d., as compared with the total claimed of £642 13s. 8d. Negligence was alleged on the part of the Corporation in allowing the tramcar to be overloaded, driving at an excessive speed down an incline, and failure to maintain the tramcar and the tramway track in proper order.

Late Services at Hull.—At a recent meeting of the Tramways Committee, Mr. W. J. McCombe, the manager, presented figures, at the request of one of the members, showing the receipts per mile run after 10.45 p.m. on weekdays and 10 p.m. on Sundays. The figures show that the average earnings are 5·96d. per car mile, while the working charges average 6·9d. Mr. McCombe pointed out the fact that there were other portions of the day when the cars were not running at a profit; between 10 a.m. and noon they ran practically the same service as between 3 and 5 p.m., and the receipts averaged 6d. per mile. It had been suggested that the cars should cease running at 11 p.m. on weekdays and 10 p.m. on Sundays. Councillor Exley thought that it would be safer for the public and the employees if the cars were stopped earlier; but Councillor Raine, the deputy chairman, said he thought it better to get the people off the streets, and that was the reason for continuing the present service. It was agreed that no change should be made.

Award to London Omnibus and Tramway Workers.—The Committee on Production has awarded the following weekly increases to London General Omnibus workers:—Drivers and conductors, 4s., inside adult staff, 4s. This award is in addition to the 5s. a week granted to drivers and conductors and the 4s. granted to garage staffs last June. The war wage advances now being paid to engineering labourers working with skilled craftsmen are increased to 15s. a week. The following weekly advances have been granted in respect of employees of the Metropolitan, the London United, and the South Metropolitan Tramways:—Men, 4s.; boys and youths under 18 years of age, 2s. In the case of engineering labourers working with skilled craftsmen, the war wage advances now being paid are increased to 15s. per week. The increases are in addition to the advances granted last May. The amounts awarded in each case are to be regarded as "war wages and recognised as due to and dependent on the existence of the abnormal conditions now prevailing in consequence of the war."

Alterations in the Newcastle Services.—At a recent meeting of the Newcastle Corporation Tramways Committee, several important alterations in the services were decided upon. At the conclusion of the meeting a statement was issued for publication, in which it was pointed out that the Committee are faced with many important problems at the present time. The constant pressure for an increased service of cars for workmen shows no diminution. The management has at the same time to deal with the difficulty of maintaining a regular service in the winter time, when driving is more dangerous owing to greasy rails, inexperienced drivers and darkened streets, and there is also more danger from drivers of vehicles. The service will be curtailed on certain routes, but an endeavour has been made to rearrange the services in such a manner as to provide a more regular service on all routes, while more cars will be liberated for workmen. With this end in view the number of stopping places has been revised with the object of minimising time. With this and other changes, the Committee feel that they can do nothing more in the way of providing services for munition workers, but are of opinion that the railway system must be called upon if anything more is required. The Committee ask ladies to do their shopping early in the day, and urge the public to avoid using the cars between 4 and 6 p.m. as much as possible.

Edinburgh Tramways Extension.—At a meeting of the Edinburgh Council on October 29, it was decided to proceed with the Queensferry tramway extension. Since the last meeting the Admiralty had indicated that they wished the tramway to be extended to Port Edgar. Mr. Harrison, convener of the Tramways Committee, advised the Council to construct the tramway to Queensferry, and on his motion it was agreed that Parliamentary powers should be applied for in the ensuing session to construct an electric tramway to Port Edgar, with a branch to the Hawes Pier at Queensferry, and that a branch of the line should be carried over the Dean Bridge to Craigleith, and that another branch should be carried from Frederick Street via Comely Bank. It was remitted to the Committee to settle the details of the routes and to give Parliamentary notice in November. One reason why they should not delay, the convener said, was that certain parties had already planned for the Queensferry tramway, but they would not go on if the Council decided to take the matter up. An electric car system would be cheaper than omnibuses, but though the Dean Bridge route was the best, the burgh engineer objected to the overhead wires upon the bridge, and the probability was that from Hope Street to the-bridge the cars would be worked by electrical accumulators. The Admiralty cordially approved of the Port Edgar project of running the tram lines along the high road behind the High Street, and of extending a branch line to the Hawes Pier. Port Edgar would become a residential quarter after the war. After considerable discussion Mr. Harrison's motion was passed, but the time for applying for powers was left to the town clerk to decide, the understanding being that he would inform the Tramways Committee as soon as it was possible to proceed, whether in November or March. The total expenditure is estimated at about £175,000, with an annual net surplus of £2,800 on the working basis of a fare of 6d. for a single journey of eight miles to Queensferry.

PERSONAL.

Pioneer J. Fetter, Signal section, Royal Engineers, who has been awarded the Military Medal, was an employee of Aberdeen Corporation Tramways Department.

Mr. H. R. Docker, second class assistant in the London County Council tramways department, has been appointed time-tables assistant at a salary of £262, rising to £300.

Doncaster Corporation have granted increases of £50 per annum to Mr. G. A. Roberts, acting electrical engineer, and Mr. T. Potts, acting traffic manager of the tramways, during the absence of Mr. E. S. Rayner, the manager and electrical engineer.

Mr. H. W. Woods, senior charge engineer in the Manchester Corporation electricity department, has been appointed a charge shift engineer at Greenwich power station of the London County Council tramways at a salary of £250, rising to £300.

Mr. Nathaniel Bradwell, who has been in the service of the Sheffield Corporation tramways for sixteen years, has been elected assistant general secretary of the Amalgamated Association of Tramway and Vehicle Workers. Four candidates competed for the post, and out of 32,000 votes, Mr. Bradwell was awarded 24,686.

Mr. R. C. Bullough, general manager and engineer, Colchester Corporation Tramways, was recently granted an increase in salary. The Council also adopted a recommendation by the Tramways Committee congratulating Mr. Bullough on the efficient working of the tramways during the greatly-increased traffic of the last three years, and expressing satisfaction at the freedom from serious accidents and the greatly-improved revenue.

Second-Lieut. A. E. Conibear, King's Liverpool Regiment, who has died from wounds received in action in France on September 20, previous to the war was a Bristol Tramways conductor. He enlisted at the outset in the Gloucester Regt., and early in the war was wounded.

CONTRACTS AND ORDERS.

Bradford Electricity Committee have placed a contract with Parsons and Co., Ltd., for a 12,000 kw. turbo-generator at £45,775.

Edison Accumulators, Ltd., have an order from East Ham Corporation for six electrically-propelled dust vans at £1,121 each.

Mellowes, Ltd., are carrying out glazing repairs at the central car repair depot of the London County Council Tramways at a cost of £623 18s. 3d.

Salford Gas Committee have recommended the acceptance of an offer by Merssrs. J. Blake and Co., Salford, for the supply of a 20 h.-p. 2-3 ton Austin chassis, fitted with end-tipping steel-lined body, at £764.

The Rotax Motor Accessories Company, Ltd., are supplying a rolling mill to the London County Council at £120 in connection with the production at the central car repair depôt of hard-rolled copper strip for controller segments and fingers required in connection with the repair of tramcars.

LONDON COUNTY COUNCIL.

The following firms have executed the re-winding of armatures for car motors:—The Manchester Armature Repair Company (£610); Johnson and Phillips, Ltd., (£300); Home and Rowland, (£206 17s.); H. Dunn and Son (£51); British Westinghouse Electric and Manufacturing Company (£107 10s.); the Magic Appliances, Ltd. (£90).

Tenders for the supply of 3,724 yards of trolley wire were received from the British Insulated and Helsby Cables, Ltd., £396 2s., and from Frederick Smith and Company, £398 17s. The former was accepted.

The Highways Committee have reported to the Council the following particulars of various works for which they had arranged in connection with Greenwich generating station:—

(i) Purchase for £20 16s. 4d. from J. Hopkinson and Company, Ltd., of two valves for repairing boilers.

(ii) Purchase for £64 10s. from the Power Plant Company, Ltd., of two sets of double helical gears.

(iii) Purchase from the British Westinghouse Electric and Manufacturing Company, Ltd., of a steam chest for No. 1 turbo-alternator for £177 10s., this being one-half the cost, subject to the old steam chest castings becoming the property of the Company. Further expenditure of £20 sanctioned for fixing the chest.

(iv) Purchase for £235 10s, from Babcock and Wilcox, Ltd., of a set of stoker links for the boilers.

(v) Repair for £53 19s. 4d. by the Electric Construction Company, Ltd., of a motor and choker and switch,

(vi) Purchase for £43 from the British Westinghouse Electric and Manufacturing Company, Ltd., of a high-pressure gland with paddle wheel casing for turbo-generators.

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DICK, KERR AND COMPANY, LTD.

The ordinary general meeting was held on Wednesday at the Cannon Street Hotel, Mr. Claud T. Cayley, the Chairman, presiding. In moving the adoption of the directors' report, which was summarised in our last issue, the chairman pointed out that the net profits showed an appreciable increase. The total assets and liabilities indicated the magnitude of the company's operations, but under present circumstances the directors were unable to publish details. The capital expenditure on works showed a decrease on last year's figures due to the policy of writing off what was considered ample depreciation against this item. The Government continued to be their principal customers, with continually increasing demands both in quantity and variety. He wished he were allowed to give details of the ramifications of manufacture and construction which they had successfully completed, and still more what was to be done in the immediate future The national factory referred to in the report had been handed over to the Government, and they had now in hand the erection of two more factories for another purpose. These, together with important works in different parts of the country, would keep the contracting department very busy, and the staff of trained engineers fully occupied. Referring to the controlling interest which had been acquired in the United Electric Car Company, Ltd., he was glad to say that the board felt this transaction to be fully justified; so much so that the shops were being extended to cope with work of great importance entrusted to them by the Government. The Car Company were their next-door neighbours at Preston, the works occupying an area of some fifteen acres. The directors were satisfied that after the war there would be no difficulty in keeping the car works fully occupied with profitable work, and in the meantime they were serving national interests. Last year they reported the acquisition and control of Willans and Robinson, Ltd. They had acquired 86 per cent. of the preferred B stock of the company, which had certain participating rights. The transaction had been completed after the close of the year under review, partly by payment in cash and partly by exchange of shares.

Last year he indicated the likelihood of having to face a period of uncertainty during the transition from war conditions to normal conditions. The directors and the management fully realised this, and they were doing what they could in organising for the future, so as to make the transition period as short as possible. They might safely assume the immediate demand for the products of their works and their engineering contracting organisation would be very great. Like all large employers, they were naturally following the attitude of labour, and fully realised that to meet the necessities after the war a complete understanding and co-operation between capital and labour was both desirable and necessary. They had confidence that all would be well in this direction, provided labour met in a spirit recognising that an entirely new basis of relationship must be established. If the country and the empire would meet the new conditions that were bound to arise after the war fairly and squarely by adopting new methods of empire and international commercial relationship, he thought the internal relations of employers and employees could safely be left to the common sense of those directly concerned.

Mr. Cayley, the chairman, and Mr. C. D. Ellis were re-elected directors.

In thanking the shareholders, Mr. Cayley said they could all see that the position of the company was now entirely different to what it was two and a half years ago, and he paid a high tribute to Mr. Rutherford, the managing director.

Mr. E. J. Fox, in proposing a vote of thanks to the chairman, the directors, and the managing director, congratulated the board upon its policy of amalgamation and extension. He wished particularly to mention Mr. Rutherford, who was very largely responsible for the success the company had achieved.

Institution of Civil Engineers.—The opening meeting of the ninety-ninth session will be held on Tuesday, November 6, at 5.30 p.m., when the president, Mr. Harry Edward Jones, will deliver his inaugural address.

Tramways and Light Railways Association.—The Journal of this Association for October contains a number of official notices of importance to all tramway operators. Among them is the text of the awards in respect of applications for advances in wages made by the employees of the Birmingham and Midland Tramways Joint Committee, the Edinburgh and District Tramways Company, and the Lancashire and Cheshire Tramways. The secretary of the Association announces that an agreement has been made with the Board of Inland Revenue whereby the Tramways and Light Railways Association will in future pay income tax upon any surplus revenue. Members will therefore be entitled to include the amount of their subscription as an expense in their income tax returns.

Electric Tramcar Handbook
FOR
MOTORMEN, INSPECTORS,
AND DEPOT WORKERS.
By W. A. AGNEW.
120 Pages, 7 ins. by 4½ ins. Cloth. Price, *1s. 6d.* Postage, *2d.*
Copies can be obtained from THE TRAMWAY AND RAILWAY WORLD Offices, Amberley House, Norfolk Street, W.C.

FINANCIAL REPORTS AND MEETINGS.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended October 31 amounted to £52,306 an increase of £4,824 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to October 31 (thirty and a half weeks) the total receipts were £1,704,267, an increase of £209,406 on the corresponding period of 1916.

Croydon Corporation Tramways.—In his annual report for the year ended March 31, Mr. T. B. Goodyer, general manager of Croydon Corporation tramways, states that the total revenue amounted to £89,585, a decrease of £3,935, and the total expenses to £75,537, including war allowances of £5,823. The credit balance is thus £14,048. Including bank interest, there is a gross balance of £16,296, and deducting interest on capital (£7,851), contributions to sinking fund (£7,455) and income-tax (£2,624), there is a deficit of £1,633. The decrease in the gross receipts is attributed to a strike of employees in 1916, loss of Bank Holiday traffic, and a breakdown in the power station, necessitating temporarily reduced services. The increased charge for electrical energy amounted to £1,501. The total traffic revenue per car mile was 10·49d., and the ratio of working expenses to revenue, 75·92 per cent.

The Prospect at Belfast.—September brought the Corporation Tramways the largest revenue in their existence, viz., £29,496, or £625 beyond the total in August, plus a day's income. The revenue per car mile was 13·85d. In September, 1916, the receipts were £3,882 less than for September, 1917. In the latter month the car miles decreased by 10,000, which at the present amount of working expenses represents a saving of about £350. Passengers numbered 113,000 more than in August, the average fare per passenger being 1·13d., as against 1 03d. in September, 1916. Calculated on the basis of the September total of 6,138,000 passengers, this would mean a yearly sum of £30,690 derived solely from the increase in the fares, which were raised in May last. The increase in revenue and decrease in expenditure resulted in a surplus profit for September of £1,805, sufficient to wipe out the deficit of the earlier months, and to begin the second half of the financial year with a balance of £316.

Wallasey Corporation Tramways.—The total receipts for the year ended March 31, 1917, amounted to £70,756, an increase of £4,435, the receipts p.r car mile being 13·58d., as compared with 12·92d. The working expenditure, including £2,749 war allowances to employees, was £45,861, or 8·80d. per car mile, compared with £44,569, or 8·68d. per car mile, or a net increase of £1,292. This amount is made up of various items, additional wages accounting for £1,050. The net revenue (including bank interest £192), together with £1,938 brought forward from the previous year, was £27,025. After providing for capital charges, including interest, £6,462; sinking fund, £4,099; and instalment of loans, £1,106; the balance of £3,000 was passed to the depreciation and renewals fund, £8,500 was paid to the general district rate, and £3,858 was carried forward. The passengers carried numbered 15,125,641, showing an increase of 819,020, and the mileage run 1,249,807, or 18,338 miles in excess of 1916. In his report the general manager remarks that the receipts constitute the highest yet reached in the history of the undertaking, and indicate its continued and steady progress. It has been possible during the year to effect only absolutely necessary repairs in the maintenance and upkeep of the rolling stock, and the manager warns the committee that a large amount will have to be expended on the return of normal conditions.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended October 20 give total receipts of £196,074 or £26,494 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £96 12s. 8d. per mile of single track, and last year at the rate of £83 11s. 6d., thus showing an increase for the week of £13 1s. 2d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.,
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH NOV. 1, or previous.	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	71⅛	72
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅛	61/-	60/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4½	48/9	48/9
4%	4%	Do. 4% Deb.	100	91	70	70½
4½%	4½%	Do. 4½% Deb.	100	98½	71⅞	73¼
5%	5%	Do. 5% Deb.	100	96	67½	68
—	—	Associated Omnibus Co., Ord. ..	5/-	5/32	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 1/32	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	104⅛	104
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	3/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71⅞	71⅞
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77¼	77¼
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	43½	44⅜
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	90½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27	27
6%	5%	Do. Pref. Ord.	100	106	28	28
5%	5%	Do. 5% Cum. Pref. ..	100	103	41	40
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	83	83
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	51	51½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	31	28½
6%	6%	Do. 6% Cum. Part. Pref.	100	—	73	72⅞
5%	5%	Do. 5% Deb.	100	92	75	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65⅝
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	74	74
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	7 1/16	6⅝
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71⅛	71⅛
1/-*	1/-*	Cape Elec. Trams.	1	1/16	11/-	11/-
1/3	1/3	City of B. A. Trams	5	5½	83/1½	82/6
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82½	82½
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7⅛	7⅛
6/-	6/-	Do. 6% Pref.	10	12	10 13/16	10 13/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	1/16	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	1/16	17/1½	17/1½
5%	5%	Do. 5% Deb. ..	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44⅜	44⅜
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 11/16	9 11/16
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79⅛	79⅛
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord.	1	—	10/-	15/-
—	1½d.	London & Sub. Traction Ord. ..	1	1/32	2/4	1/9
6d.	6d.	Do. 5% Pref.	1	7/16	7/6	6/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61⅞	61⅞
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	80	81
5%	5%	Do. 5% Inc. Deb.	100	88½	78	78
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	33	32⅝
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%	9¾d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	67	67
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71⅛	71⅛
5%	5%	Do. 5% Deb.	100	87	80	80
$1½	$1½	Mexico Trams. Common ..	$100	70	33½	33½
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	36	38½
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	92½	92½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	90½	90
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	1/32	20/3	19/6
9¾d.*	9¾d.*	New General Traction	1	1/32	7/3	7/3
8½d.	6d.	Northern Gen. Trans. Ord. ..	1	1/32	13/-	13/-
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	80/3	81/3
5%	5%	Do. 5% 1st Deb. ..	100	89½	76	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/6	7/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/9	12/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	1/32	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	3/32	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	3/32	19/9	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	77½	78
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	73½	74½
12/-	10/-	Shanghai Elec. Cons.	10	13	14⅛	14⅛
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/6	4/9
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94⅜	94⅜
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	67½	67½
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	1/32	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	3/32	82/6	83/9
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	16	16
—	—	Undgd. Elec. Rys. of London ..	10	21½	36/3	38/9
		Do. "A"	1/-	3/32	6/-	6/3
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	103½	103½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102½	102½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	83⅜	84

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec
Aberdare U.D.C. ..	Oct. 23	407	418	+ 11	29	12,965	+ 1,107
Aberdeen Corporation ..	„ 24	1,771	1,954	+ 183	21	46,298	+ 5,269
Ayr Corporation	„ 27	278	327	+ 49	24	13,138	+ 1,233
Belfast City	„ 26	5,756	6,985	+ 1,229	30	190,969	+ 19,786
Birkenhead Corporation ..	„ 28	1,547	1,793	+ 246	30½	55,577	+ 8,270
Birmingham Corporation ..	„ 20	14,776	19,149	+ 4,383	29	528,118	+ 47,227
do. Motor Omnibuses ..	„ 20	991	1,174	+ 183	29	29,747	+ 400
Blackburn Corporation ..	„ 24	1,158	1,358	+ 200	30½	46,518	+ 6,929
Blackpool & Fleetwood ..	„ 27	379	418	+ 39	42	40,260	+ 211
Bournemouth Corporation ..	„ 31	2,050	2,418	+ 368	30½	81,400	+ 6,106
Bradford Corporation ..	„ 27	6,358	7,331	+ 973	30	234,075	+ 23,137
Bristol	„ 26	4,830	4,034	— 796	43	233,041	+ 20,935
Burnley Corporation ..	„ 27	1,594	1,810	+ 216	..	..	..
Burton-on-Trent Cor. ..	„ 28	285	319	+ 34	30	9,346	+ 841
Bury Corporation	„ 28	1,274	1,482	+ 208	30½	51,124	+ 6,112
Chatham & District ..	„ 18	1,316	1,210	— 106	42	54,307	+ 2,110
Cork Electric	„ 18	544	567	+ 23	42	23,138	+ 1,503
Derby Corporation ..	„ 20	1,148	1,210	+ 62	29	35,380	+ 1,352
Dublin United	„ 26	6,165	6,846	+ 681	43	288,749	+ 27,363
Dundee City	„ 24	1,355	1,488	+ 133	23½	36,334	+ 3,343
East Ham Corporation ..	„ 27	1,244	1,262	+ 18	30	42,732	+ 2,569
Exeter Corporation ..	„ 26	377	379	+ 2	30	12,455	— 67
Glasgow Corporation ..	„ 27	23,936	26,185	+ 2,249	21⅔	564,924	+ 64 389
Glossop (U.E. Sup. Co.) ..	„ 27	146	168	+ 22	43	6,596	+ 600
Halifax Corporation ..	„ 23	2,097	2,311	+ 214	29⅔	75,443	+ 6,037
do. Motor Buses ..	„ 23	49	48	— 1	29⅔	1,446	— 61
Hastings and District ..	„ 28	836	1,124	+ 288	43	54,486	+ 8,363
Huddersfield Corporation ..	„ 27	2,661	3,032	+ 371	30	99,980	+ 9,385
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	Oct. 27	626	694	+ 68	30	23,391	+ 2,356
Ipswich Corporation ..	„ 27	442	635	+ 193	30	21,398	+ 4,871
Isle of Thanet	„ 27	258	157	— 101	4	713	— 511
Kilmarnock Corporation ..	„ 27	177	203	+ 26	23½	4,681	+ 427
Lanarkshire	„ 18	2,289	2,980	+ 691	42	115,955	+ 18,488
Lancashire United ..	„ 24	1,873	2,411	+ 538	43	100,858	+ 21,990
Leeds City	„ 27	9,585	10,783	+ 1,198	30	333,846	+ 33,843
Leicester Corporation ..	„ 27	3,411	3,849	+ 438	..	..	..
Leith Corporation ..	„ 27	842	1,017	+ 175	23½	25,785	+ 4,546
Leyton U.D. Council ..	„ 25	1,449	1,728	+ 279	30	57,380	+ 5,964
Liverpool Corporation ..	„ 27	14,265	15,925	+ 1,660	42⅔	666,435	+ 59,746
Llandudno & Colwyn Bay	„ 26	255	271	+ 16	47½	16,855	— 902
London County Council	„ 31	47,482	52,306	+ 4,824	30½	1,704,267	+ 209,406
Maidstone Corporation ..	„ 25	197	215	+ 18	30	7,532	+ 690
Manchester Corporation	„ 27	18,678	20,794	+ 2,116	30	621,480	+ 48,128
Nelson Corporation ..	„ 20	197	219	+ 22	29	6,926	+ 531
Newcastle-on-Tyne Cor.	„ 27	6,885	7,988	+ 1,003	30	235,707	+ 33,635
New St. Helens & Dist. ..	„ 24	1,085	1,249	+ 164	17	26,249	+ 6,713
Northampton Cor. ..	„ 26	714	865	+ 151	30	25,239	+ 3,561
Nottingham Corporation	„ 25	3,939	4,445	+ 506	30	132,282	+ 12,774
Oldham Corporation ..	„ 28	2,214	2,649	+ 435	31	88,854	+ 10,146
Portsmouth Corporation	„ 27	2,465	2,581	+ 116	..	..	..
Provincial	„ 27	2,134	2,335	+ 201	3⅔	9,138	+ 507
Reading Corporation ..	„ 18	891	1,088	+ 197	29⅔	30,630	+ 5,443
Rhondda Tramways ..	„ 25	1,375	1,577	+ 202	43	64,391	+ 9,025
Rotherham Corporation	„ 31	1,588	1,837	+ 249	30½	55,119	+ 7,272
Salford Corporation ..	„ 29	5,231	6,311	+ 1,080	30⅔	201,421	+ 32,109
Sheffield Corporation ..	„ 28	10,489	12,199	+ 1,710	31	371,561	+ 43,026
Southampton Cor. ..	„ 24	1,623	2,144	+ 520	29⅔	61,099	+ 10,172
Southend-on-Sea Cor. ..	„ 24	685	622	— 63	30	30,115	— 803
South Shields Cor. ..	„ 13	854	926	+ 72	15	27,042	+ 3,009
Sunderland Corporation.	„ 28	1,625	1,830	+ 205	30	55,292	+ 4,816
Sunderland District ..	„ 17	726	854	+ 128	51	36,869	+ 5,145
Swindon Corporation	„ 24	199	258	+ 59	29½	8,188	+ 1,973
Torquay Tramways	„ 25	519	691	+ 172	43	28,762	+ 2,499
Tyneside Trys. & Trmds	„ 17	633	825	+ 192	16	14,946	- 3,699
Wallasey Corporation ..	„ 27	1,221	1,420	+ 199	30½	49,286	+ 5,755
Walsall Corporation ..	„ 27	822	990	+ 168	30	29,447	+ 3,823
Walthamstow U.D. Coun.	„ 27	993	1,068	+ 75	30	33,141	+ 3,786
Warrington Corporation	„ 4	463	592	+ 129	27	14,491	+ 1,148
West Ham Corporation	„ 25	3,091	3,412	+ 321	29⅔	110,348	+ 11,668
Wigan Corporation ..	„ 25	1,726	2,311	+ 585	30	59,409	+ 8,366
Yorkshire (West Riding)	„ 28	1,672	2,240	+ 568	43	91,143	+ 15,361

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Oct. 28	£52,134	£53,732	43	£2,218,241	+ £27,698
Auckland .. (28 days)	Sept. 21	20,884	22,154	12	64,876	+ 2,018
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Aug.	7,405,000	8,064,000	34	60,505,000	+ 4,492,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Aug.	423,728	454,425	8	892,803	+ 57,218
Buenos Aires Lacroze ..	Aug.	36,431	39,111	8	77,174	+ 2,304
Burmah Tram. & Light Rs.	Sept.	23,749	26,168	8	52,882	+ 4,720
Calcutta .. .. Rs.	Oct. 27	63,346	63,364	43	2,938,287	+ 26,810
Cape Town	Aug.	13,394	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Sept.	1,779	4,306	39	38,405	+ 15,805
Cordoba	Aug.	13,851	14,278	22	70,432	— 738
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Sept.	2,523	1,512	9	3,074	— 1,971
Hong Kong .. .. $	Sept. 1	17,048	15,358	35	471,298	— 37,555
Kalgoorlie	June	2,500	2,648	26	15,441	+ 504
La Plata	Sept.	3,993	3,450	39	36,545	— 1,076
Lima	Sept.	33,340	35,621	39	322,195	+ 18,107
Lisbon .. .. Escu	Aug.	203,703	246,734	..	..	..
Madras .. .. Rs.	Sept. 30	31,788	34,219	38	624,412	+ 54,626
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	July	152,380	162,157	..	..	..
Montevideo	Sept.	26,711	29,426	48	329,679	+ 10,636
Pernambuco	Oct. 28	3,166	4,194	42	163,170	+ 32,635
Peruvian .. .. $	Sept.	911,910	950,740	13	2,905,170	+ 261,930
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Sept.	4,137	5,163	39	44,354	+ 3,026
Shanghai .. .. $	Aug. 22	21,712	22,369	..	..	..
Singapore .. .. $	Sept. 1	12,596	12,501	35	451,416	+ 13,323
Toronto .. .. $	Aug.	889,241	1,039,819	34	7,867,595	+ 775,323
Winnipeg .. .. $	Aug.	249,795	248,457	34	2,164,624	— 29,333

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What's wrong with the Track?"

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CHAPTER II.—CONCRETE MATERIALS.
Road metal—Water-gravel—Sand—Clinker-sand—Trass.

CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.
Patching—Partial repairs—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and Padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

CHAPTER XII.—TRACK PAVING.
Effect of vehicular traffic—Cause of loose rails—Importance of quality in setts—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

CHAPTER XIII.—RECONSTRUCTION.
Removal of tracks—Temporary tracks.

CHAPTER XIV.—SURFACE DRAINAGE AND RAIL MAINTENANCE.
Rail cleaning—Rail grinding—Rail planing.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BRADFORD.

Tramways Department.

General Stores.

Tenders are invited for the Supply and Delivery of the various Articles (for which Tenders may be accepted), for delivery as and when required, during twelve months ending December 31, 1918, or alternatively, for the Supply and Delivery of the whole of the Material scheduled (for which Tenders may be accepted) during the month of January, 1918.

For Delivery as Required during Twelve Months or during January, 1918:—

Schedule No.

1. Bolts, Nuts, Screws, Washers, Nails, Cotter Pins, Rivets, Brass Rod, Lead, Hack Saw Blades, Miscellaneous Ironmongery, and Steam and Gas Pipes and Fittings.
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15. Waste.
17. Glass.

Schedule and Conditions of Tender may be had on application at the Tramway Offices, 7, Hall Ings, Bradford, on payment of the sum of one guinea (£1 1s.), which amount will be refunded on receipt of a bona-fide Tender (cheques to be made payable to the order of the Bradford Corporation).

The Contracts will be let subject to the Fair Contracts Clauses of the Corporation.

Samples can be inspected at the Tramway Offices, 7, Hall Ings, Bradford.

Tenders, endorsed "Tender for Stores," to be sent to me not later than Saturday, November 24. The lowest or any Tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
October 31, 1917.

GREAT NORTH OF SCOTLAND RAILWAY COMPANY.

Contracts for Stores.

The Directors of the Great North of Scotland Railway Company are prepared to receive Tenders for the supply of the undermentioned Stores, for six or twelve months (in the Company's option), from 1st January, 1918:—

	No. of Form.
Brooms, Brushes, &c.	1
Canvas, Ropes, Flax and Twine	2
Carriage Cloth and Trimmings	3
Carriage Furnishings (Locks, Hinges, &c.)	4
Cement and Lime	5
Chamois Skins and Sponges	6
Cotton Waste, Lamp Wick, Sponge Cloths, Flannel, &c.	7
Crucibles	8
Drysalteries	9
Files, Steel and Steel Castings	11
Fireclay, Bricks, Pipes, &c.	12
Galvanised Fencing and Signal Wire and Steel Tail Ropes	13
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India Rubber Goods, Balata Belting and Engine Packing	16
Bar Iron	17
Iron Castings	18
Ironmongery	19
Leather and Leather Belting	22
Nails, Tacks, Tap Pins, Screws and Cotter Pins	24
Oils, Tallow and Turpentine	25
Soap and Candles	27
Screws (Wood) and Washers	28
Springs (Bearing, Buffing, &c.)	29
Steel Boiler Tubes	30
Steel Tires and Axles for Engines, Carriages and Wagons	31
Transfers (Carriage, &c.)	32
Telegraph Material	32A

Forms of Tenders can be obtained from the Stores Superintendent, 80, Guild Street, Aberdeen, after 9th proximo, on payment of One Shilling for each form.

Patterns may be inspected at the Stores Depôt, Inverurie, between the hours of 10 a.m. and 4 p.m., from Monday, 12th, to Monday, 19th November, inclusive, except on Saturday, 17th, when they will not be on view after 12 o'clock noon.

Tenders, endorsed "Tender for Stores," must be lodged with the undersigned not later than 10 a.m. on Thursday, 22nd November next.

The Directors do not bind themselves to accept the lowest or any Tender.

T. S. MACKINTOSH,
Secretary.

Company's Offices,
80, Guild Street, Aberdeen.
29th October, 1917.

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THE
Tramway and Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, NOVEMBER 10, 1917.

COMPLAINTS OF LONDON TRAMWAYS.

Notwithstanding inevitable shortcomings, due solely to the war, there is little foundation for the criticism with which the *Pall Mall Gazette* is assailing London railway, tramway, and omnibus services. If the writers knew anything of the way in which the ranks of the employees have been depleted, with the consequent reduction of vehicles in service, they would commend rather than find fault. Proof that their exaggerations cannot be substantiated is shown by their failure to find support. It is quite possible that if the truth were known the cause of the outburst would be found in some discomfort suffered by members of the editorial staff in having lately to journey home amid the crush entailed by the closing of offices, factories and shops an hour earlier in consequence of aerial commotion. As is well known, the peak load has been greatly increased by the enormous growth of traffic during the past two years. In time of peace such an addition would have imposed a severe strain on the various means of locomotion, and in war-time conditions the difficulty of coping with the rush is almost overwhelming. The increased demand has been met in a manner that deserves commendation rather than criticism entirely devoid of helpful features. From among the statements that show unfamiliarity with the subject we may take a few typical examples. The rush hours are referred to as extending from 5 o'clock to 8, whereas, owing to the reasons already stated, the period of the heaviest traffic is now from 4.30 until 6.30 p.m. There never has been pressure as late as 8 o'clock. It is asserted that thousands of people scramble in vain for accommodation on the County Council cars. The only approach to a scramble is at the places on the Embankment where there are no enclosed queues. It would be almost impossible for the management to use more cars than at present run on these lines during the busy period. What really happens is less a scramble than a spreading out of the people at all the stopping-places on both tracks. A breakdown on any route is never, it is asserted, notified to the crowds waiting at the three bridges, and it is alleged that on November 1st big crowds remained in the rain nearly an hour before the rumour spread that it would be advisable to proceed by other routes. How passengers could take advantage of that is not plain when the critic states in his next sentence that there is seldom the chance of getting an omnibus and the Underground trains are invariably packed. As a matter of fact, a breakdown is, as a rule, soon notified. On the suburban railways the writer says that "irregularity is now accepted as a grievance and must be endured," and he demands that all suburban lines which are closed should be re-opened during the rush hours. But no lines have been closed; what has happened is that a few stations have been shut in order to divert traffic to street vehicles, so as to set free men and rolling-stock for service in France. Still less helpful is the demand that more omnibuses should be provided by the adoption of gas as motive power. In view of the fact that the shortage of vehicles is due to impressment, and to the company's manufacturing plant being engaged on Government work, it is difficult to discover the source whence additional vehicles are to be obtained. Help cannot be looked for from omnibuses with the top deck devoted to gas containers. Nor is it possible to set up meters and fittings for recharging at the numerous stations that would be required. The only means by which it would be possible to improve the means of surface travel would be to call for volunteers to be trained as motormen. This course has proved invaluable in Newcastle and some other cities where street traffic is as congested as on any London tramway route.

THE PROPOSED EDINBURGH TO QUEENSFERRY TRAMWAY.

The meeting of Edinburgh Town Council on October 30, which, as reported in our issue of November 3, decided to apply for Parliamentary powers to construct an electric tramway from Edinburgh to Queensferry—a distance of eight miles—had before it as a basis interesting reports by Mr. J. B. Hamilton, general manager of Leeds City Tramways, Mr. Peter Fisher, general manager of Dundee Corporation Tramways, and Mr. A. H. Campbell, burgh engineer of Edinburgh.

Messrs. Hamilton and Fisher, in their reports, expressed the view that the estimates for construction prepared by the burgh engineer are more than ample to cover all costs of construction which it is reasonable to forecast. After having gone into figures of population, of pleasure traffic, and estimates of revenue and working expenses, they believe that the Tramways Committee need have no hesitation in recommending the construction of the line. It will be entirely self supporting, and when the whole of the Edinburgh tramways pass into the hands of the Corporation, it will give a considerable augmentation to the tramway revenue. As compared with motor omnibus services, no case can be seriously put forward for challenging a decision to instal the well-tried and proved form of traction by overhead electric tramways. With a capital expenditure of £185,000, they estimated a net annual surplus of £5,000. The burgh engineer had put the figure at £2,792.

Mr. Campbell, in his report, which was supplementary to one previously issued, discussed the relative costs of motor omnibuses and electric tramways. He stated that the cost of working motor omnibuses may be estimated at from 8·5d. (pre-war) to 13·17d. and upwards to 16·81d. per mile run of 32 passengers (current maximum rate). The cost of working an electric tramcar may be stated at from 5·9d. to 11·44d. (current maximum rate) per car mile of 62 passengers. In Birmingham, the cost was 9.873d. per bus mile and 8.54d. per car mile. In Birmingham the cost of working omnibuses, seat for seat, may be stated at 1·87 times that of a tramcar, and 2.12 times that of a tramcar in Sheffield. The annual repayment towards redemption of capital will add to the working cost on the Queensferry Tramway 4·5d. per car mile, and in the case of omnibuses the contributions under this head would add 1·88d. per bus mile. The total cost of tramway operation on the Queensferry route he put at 11d. per car mile, as against 11·753d. per bus mile. Per passenger the respective costs are ·183d. for the tramcar, and ·346d. for the omnibus. The motor omnibus is in the total of operating and capital costs approximately 89 per cent. more expensive than the tramcar, seat for seat. If the omnibus were adopted, the fare for the entire distance would have to be 9d. instead of 6d. as proposed for the tramway. He also dwelt on the greater comfort, convenience and power of expansion of a tramway service.

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REVISION OF FARES.

London United Tramways Company have informed the county and local authorities of their intention to promote a Bill next session to relieve them from the restrictions imposed with regard to fares, and also to permit abandonment of some portions of their lines in Middlesex and Surrey.

Preston Corporation have referred back to the Tramways Committee a scheme for rearrangement of fares. The opposition declared that the present fares were the second or third highest of the fifty largest towns from which information was available.

Alderman Linsley, chairman of Salford Tramways Committee, in reporting to the Corporation the recent weekly increase of £140 on employees' wages, and £85 to men serving with the forces, ordered by the Committee on Production, remarked that it was fortunate the Council some time ago increased the fares. The annual extra charges on the department, as compared with the pre-war year, was £54,756, and even if no further awards were made and the receipts continued to be satisfactory, the Committee might have to ask for help from the rates for the renewals fund. The Council agreed to a recommendation by the Electricity Committee to increase the charges for lighting and power from 10 per cent. to 20 per cent. for lighting and 15 to 30 per cent. for power.

Manchester Corporation, on October 31, by 57 votes to 38, directed the Tramways Committee to consider an increase of fares. Alderman Bowes, chairman, desired to postpone action till the special committee on municipal trading profits had reported, in order that the committee might know whether it was intended to ask that the undertaking should continue to pay the present sum annually devoted to relief of the rates. In the course of a long debate nearly every speaker insisted that an increase of fares was essential to the proper upkeep of the department, and that it would be wrong to increase the fares if the resulting profit were to go to the relief of the rates. A report, prepared by Mr. J. M. McElroy, general manager, showed that the revenue for the half-year was £543,624 as compared with £506,558. The total expenditure was £455,011. The car miles run during the six months was 9,381,230. Expenditure on renewals accounted for £13,000. The recent arbitration awards granting further war bonuses will cost £45,000 per annum. This makes the total amount payable as war bonuses and war service allowances nearly £200,000 per annum. Mr. McElroy recommended revision of the fares.

The increased fares on the Belfast Tramways had the effect during the past half-year of arresting the unprofitable working, and Ald. Tyrrell, chairman of the Tramways Committee, has informed the Corporation that there is ground for hoping that the policy of the committee and the management will be instrumental in bringing the undertaking successfully through the present trying period. Any increase of the present working costs would need a further revision of the fares. The higher working charges had reduced the gross profit to £316, or £3,567 less than the surplus for the first half of last year. Without the additional revenue brought in by the revision of fares, there would have been a deficit of nearly £17,000. The deficit of £7,000 on the year 1915-16 had still to be made good.

TRAMWAY CONTROL COMMITTEE.

The President of the Board of Trade has appointed Mr. James Devonshire as Tramway Controller under the scheme reported in our issue of last week. While the details of the arrangements to be made have not yet been announced, it is understood that Mr. Devonshire will preside over a committee which will be fully representative of tramway interests. Owing to the increasing difficulties of securing material for essential repairs, and the growing depletion of the staffs, it has for some time been seen that some form of national control would become necessary. The Board of Trade have obtained full particulars of the service which is being performed by the tramways, including the number of munition works that are served. These have greatly increased in number during the past year, and it is clear that in the majority of cases it will be impossible to carry on the munition work in the various areas without the tramway services.

MISCELLANEOUS NEWS AND NOTES.

Traffic Growth at Rotherham.—Owing to the growing importance of the tramways the Rotherham Tramways Committee propose to appoint a traffic manager.

East Ham Women Conductors on completing twelve months' service, will receive an increase in their wages, bringing them to the same scale as those of the men.

Fire on a London Car.—A fully loaded London County Council tramcar caught fire in Seven Sisters Road, on November 2. The passengers hastily alighted and the flames were extinguished by firemen.

German Contracts in Brazil Cancelled.—A Reuter's despatch from Rio de Janeiro reports that the Foreign Committee of the Chamber has authorised the Government to cancel all contracts entered into with Germany.

Tramway Extension at Hebden Bridge.—With the approval of the authorities concerned, the Hebden Bridge Council have instructed their clerk to call a conference of the Hebden Corporation, the Todmorden Corporation and the Rural District Councils concerned, to consider the possibilities of extending the tramway over the gap of one and a half miles at Hebden Bridge on which there is no tramway or omnibus service.

Teeside Tramways.—Local labour forces are to organise a vigorous campaign to appeal to the three Corporations, Middlesbrough, Stockton and Thornaby, to take over the tramway undertaking at the expiration of the lease of the Imperial Tramways Company.

Danger of Centre Standards.—Owing to a collision of a 5-ton motor lorry belonging to Messrs. Vaux and Company, of Sunderland, with one of the centre tramway standards recently, the cars on the Gosforth and Jesmond route at Newcastle were blocked for over half an hour.

Hours of Moonlight.—Messrs. C. A. Vandervell and Company, Limited, have issued a picture postcard in black and white, giving a useful moonlight chart, from which the hours of moonlight can be seen at a glance. The chart was compiled by Mr. A. H. Midgley, their chief engineer.

Loyal Employees in Buenos Ayres.—During the recent railway strike the whole of the staff of the Anglo-Argentine Tramways Company, numbering some 8,000, and representing various nationalities, remained loyal to the company in spite of pressure put upon them by the railway employees to take sympathetic action.

Bradford Employees' Demands.—The special War Wages Committee have received an application from the tramway workers for an advance of £1 per week on the pre-war rate of wages, and representations have been made on behalf of the women employees for equal treatment with the men in the matter of war bonuses.

Praise for Women Tramway Employees.—Mr. W. Murray, manager of Walthamstow Council tramways, at a meeting in aid of the Prisoners of War Fund, said that if they wanted a thing well done, they should set women to do it. After three years' experience, it had been proved that after a little training, some women could be found who could do almost any work on the tramcars that men had formerly done.

Season Tickets and Books of Tickets.—At this time, when return tickets and transfers are being temporarily suspended or restricted in order to lighten the work of conductors, it is strange that local authorities and others are suggesting the issue of season tickets and books of tickets with the same object in view. Recently the Middlesex County Council suggested that course to the Metropolitan Tramways Company, who have replied that they cannot agree to the proposal.

Accident at Dudley.—An accident occurred at Dudley on November 2, but was fortunately not attended with fatal injury to any passenger. A car got out of control near the top of Boths Hill, and attained a high rate of speed, but the car kept to the rails on a curve at the bottom. The driver of another car coming in the opposite direction promptly reversed his car, and was able to run some distance back before the runaway car collided with his car.

Birmingham Tramways and a By-Pass Road.—In consequence of the opposition of the inhabitants of Northfield village to the Birmingham Tramways Committee's scheme for constructing an extension along a by-pass road which would avoid the main thoroughfare, the Town Planning, Public Works, and Tramways Committees have reconsidered the project. The Tramways Committee subsequently decided not to proceed further at the present time with their Deviation of Tramways Bill.

Increased Charges for Electric Energy.—Todmorden Electricity Committee has decided to increase the charges for electric energy by 10 per cent. Wakefield Electricity Committee propose to increase the charge for electric energy as on December 1 by 25 per cent. over the current prices. For lighting, the increase will be 12½ per cent. York Electricity Committee on January 1 will increase the charges for power by 10 per cent. Accrington Corporation has given notice to terminate the agreement for the supply of electricity to Haslingden from December 31, 1918, with a view to a readjustment of the terms.

Glasgow Women Not Entitled to Men's Wages.—In submitting to Glasgow Tramways Committee the award of the arbitrator on applications for increased pay, the Town Clerk stated that the pre-war remuneration of men had been increased by 15s. per week (7s. wages and 8s. war bonus), the various grades receiving increases varying from 2s. to 7s. Female employees would receive no advance, as they had already 8s. per week more in the tramway service than they would have in a munition factory. The arbiter was of opinion that the principle to be applied to female workers was that expressed in the orders of the Minister of Munitions.

Edinburgh Tramways Arbitration.—Representatives of the Edinburgh Corporation and the Edinburgh Tramways Company met on November 3 to discuss matters in connection with the termination of the tramways lease. Sir Alexander Kennedy, who has been appointed arbiter, presided, and Councillor Harrison, convener of the Tramways Committee, Sir Thomas Hunter, town clerk, and Mr. A. H. Campbell, burgh engineer, were present on behalf of the Corporation, and Mr. J. D. R. Cox, general manager, and others represented the Company. It was arranged that a detailed report on the condition of the rolling stock should be prepared by the parties.

Munition Traffic at Newcastle.—The *Newcastle Chronicle* says that a sidelight on the extraordinary demands made upon the local tramway and train services was afforded at the meeting of the shareholders of Messrs. Armstrong, Whitworth and Company, at Newcastle, on November 3. It was then stated that there were between 70,000 and 100,000 employed by the firm. The total number of workmen employed before the war was about 20,000. In view of the depleted staff of the tramways and railways, our contemporary very rightly suggests that grumblers have reason to be grateful for the travelling facilities that have been provided under very difficult conditions.

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Aberdeen Tramwaymen's New Year's Day.—The Town Council has received from the Tramway Workers' Association a claim for a holiday on New Year's Day with a complete stoppage of the cars. A local paper remarks that "this is a tall order, seeing that the tramway service is a public utility necessary for the convenience and comfort of the public on New Year's Day—of all days."

Electric Power Supply Committee.—In reply to a question asked the President of the Board of Trade in the House of Commons on Wednesday, Mr. Wardle said that the Departmental Committee on Electric Power Supply had not yet presented a report and he could not say at present when it would be able to do so. In view of the great importance of the subject there would, however, be no avoidable delay.

Irish Light Railways and Tramways Act.—In the House of Commons, the Chief Secretary for Ireland informed Mr. Byrne that schemes under the Tramways (Ireland) Act required the approval of the County Councils concerned, which must be given at two quarterly meetings. Under Section 43 of the Tramways (Ireland) Act of 1860 mansion houses, demesnes, etc., could not be acquired without consent of owners, but by Section 5 of the Light Railways (Ireland) Act, 1889, an order of the Lord Lieutenant might provide that Section 43 of the Act of 1860 shall not apply. The railway under consideration for the development of collieries was authorised by the Defence of the Realm Regulations.

Difficulties at Oldham.—Mr. P. Priestly, the general manager, recently reported to the Tramways Committee that during a fortnight the department had lost 312 car miles through various difficulties, shortage of drivers, and delays by other vehicles. There had also been several accidents. A number of motormen and conductors regularly missed duty, and during the fortnight 250 drivers had failed to put in an appearance and 250 women conductors. The average number of drivers missing duty per day was 16. From these figures, Mr. Priestly thought the Committee would appreciate the difficulties experienced in keeping up the regular service. In only a few cases was the absence due to sickness. They had been able to maintain the workmen's service regularly, but the ordinary service had had to suffer. The Chairman suggested that the man who did not, through his own fault, do a full week's work, should not get the bonus, but the manager pointed out that the Committee on Production would not allow that. If a man worked four hours in one day, that was counted as a shift and he was entitled to the full 2s. The over-running of stops was frequent, and the manager suggested that some member of the public ought to institute police court proceedings against drivers who wilfully overran prescribed stops for infringing the Board of Trade regulations.

PERSONAL.

The Right Hon. Lord Carmichael, G.C.I.E., K.C.M.G., has accepted a seat on the board of the British Thomson-Houston Company, Ltd.

Mr. W. H. Stradling has been appointed assistant manager of the Bristol Tramways and Carriage Company, Ltd., in the continued absence on active service of Lieut.-Colonel S. E. Smith.

Mr. A. R. Fearnley, general manager of Sheffield Corporation tramways and motor department, whose present salary is £1,000, has been granted two annual increments of £100 each.

Mr. J. H. Thomas, M.P., has recently paid a visit to the front. Sir Douglas Haig, with whom he had a conversation, warmly acknowledged the splendid assistance rendered by railway men in various ways.

Mr. W. A. Toppin has been appointed assistant electrical engineer at Chesterfield Corporation electricity works at a commencing salary of £250. Mr. Toppin has been testing and commercial assistant at Greenock.

Mr. R. J. West has been appointed to fill the vacancy on the Board of Norwich Tramways Company caused by the death of the Hon. A. G. Brand, whose loss was reported with regret by the directors at the annual meeting. Mr. F. Fitzgerald was re-elected Chairman.

Lieutenant H. M. Dawson, on resigning his membership of Bingley Urban Council because of his election to Bradford Corporation, was referred to as "a man who did things," in proof of which statement the great part he took in bringing the Bradford Tramways to Bingley was mentioned.

Mr. Hy. Clayton, has been appointed assistant engineer and manager of the Preston Corporation Tramways at a salary of £200. He has been in the employ of the Corporation for about 12 years, and, it was stated, had proved himself to be an excellent officer and a good all-round engineer.

Mr. J. E. Dobson, late Scottish representative of Bruce Pebbles, and Company, Ltd., Edinburgh, has been appointed London office manager to the company, in place of the late Mr. R. W. Gauntlett, and has now taken up his new duties at Hastings House, Norfolk Street, Strand. We feel sure that Mr. Dobson's many friends both in Scotland and elsewhere will wish him every success in his new appointment.

Mr. R. H. Dickinson, chief engineer of the Birmingham Corporation Tramways, has received official intimation that his eldest son, the Rev. H. Dickinson, vicar of St. Stephen's, Birmingham, was killed in action on October 30, while acting as chaplain to the Artists Rifles. Imbued with a strong sense of devotion to duty, he volunteered for service at the front and was appointed chaplain to the General Headquarters.

Mr. F. W. Ketley, manager and engineer of Norwich Tramways Company, was warmly praised by Mr. F. Fitzgerald, who presided at the annual meeting. The Chairman's remarks were supported by the Lord Mayor of Norwich, who said that Mr. Ketley performed his duties admirably, and had ingratiated himself with the citizens by his readiness to help in any work. The staff and employees were also commended by the Chairman.

The death occurred on Sunday last of **Mr. William Du Bois Duddell,** of 56, Victoria Street, Westminster. Mr. Duddell, who was only 45 years of age, was president of the Institution of Electrical Engineers in 1913. He has recently been a member of the Admiralty Board of Invention and Research, and also of the Inventions Board of the Ministry of Munitions. In August last he was appointed a Commander of the Order of the British Empire.

CONTRACTS AND ORDERS.

The Dewhurst Engineering Company have received an order from Sunderland Corporation for steel tubes for the electricity department.

Sheffield Corporation have accepted the following tenders in connection with the emergency power house at Blackburn Meadows:—buildings, John Greenwood; structural steelwork, Gilbert Heathcote and Co.; electric capstans, Clarke, Chapman and Co., Ltd.; boosting sets, Crompton and Co., Ltd.

FINANCIAL REPORTS AND MEETINGS.

City of Buenos Ayres Tramways (1904).—A dividend has been declared of 1s. 3d. per share, being at the rate of 5 per cent. per annum, less tax, for the three months ended September 30.

L.C.C Traffic Receipts.—The traffic receipts for the week ended November 7 amounted to £54,084 an increase of £7,535 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to November 7 (thirty-one and a half weeks) the total receipts were £1,758,384, an increase of £216,974 on the corresponding period of 1916.

Norwich Tramways Company.—The annual report, presented at the shareholders' meeting on October 31, showed receipts totalling £43,712 17s., increase £880 2s. 6d., and expenditure £30,827 9s., increase £1,318 16s., making net profit £12,885 8s., decrease £438 13s. To the sum of £12,885 8s., must be added £428 10s. brought forward, making a total of £13,313 18s. to be dealt with as follows:—£8,000 reserve fund, £5,280 to payment of 2 per cent. dividend on the shares for the year ended June 30, and £33 18s. to be carried forward. The number of car miles run was 963,484, against 932,934, passengers 10,767,626 (10,405,881), earnings per mile 11·61d. (11·02d.), expenses per car mile 7·49d. (6·91d), earnings per passenger 0·97d. (0·99d.) In moving the adoption of the report, Mr. F. Fitzgerald (who presided) stated that after paying a dividend of 3 per cent. for five years, the directors were obliged to propose to return to 2 per cent., as a serious necessity had arisen of adding to the reserve, in view of the reconstruction work that must be undertaken as soon as circumstances permitted. The general rate of fares in operation was less than that authorised, and in view of the strain on the Company's resources it was felt that this was the proper time to place all passengers on an equal footing, with the exception of scholars.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended October 27 give total receipts of £190,212 or £22,933 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £93 14s. 11d. per mile of single track, and last year at the rate of £82 8s. 10d., thus showing an increase for the week of £11 6s. 1d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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ABCHURCH YARD, CANNON STREET,
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Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH, Nov. 8, or previous	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	72	71⅝
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅛	60/-	61/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4⅛	50/-	48/9
4%	4%	Do. 4% Deb.	100	91	69⅛	70
4½%	4½%	Do. 4½% Deb.	100	98⅛	72½	71⅝
5%	5%	Do. 5% Deb.	100	96	67⅛	67⅛
—	—	Associated Omnibus Co., Ord. ..	5/-	3/16	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 5/16	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	103⅛	104⅛
—	1/-	Bath Electric Trams Pref. Ord.	1	⅛	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	3/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72⅛	71⅛	71⅛
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84⅛	77⅛	77⅛
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20¼	20⅛
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅛	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88⅛	88⅛
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	43⅛	43⅛
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	90⅛
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7⅛	6⅛	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91⅛	91⅛
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	27	27
6%	5%	Do. Pref. Ord.	100	106	30	28
5%	5%	Do. 5% Cum. Pref. ..	100	103	42½	41
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99⅛	83	83
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96⅛	54	51
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	32⅛	31
6%	6%	Do. 6% Cum. Part. Pref.	100	—	74⅛	73
5%	5%	Do. 5% Deb.	100	92	75	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77⅛	65⅛	65¼
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	71⅛	74
6/6*	2/6	Calcutta Tramways Ord. ..	5	7⅛	7 1/16	7 1/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99⅛	71⅛	71⅛
1/-*	1/-*	Cape Elec. Trams.	1	11/16	11/-	11/-
1/3	1/3	City of B. A. Trams	5	5⅛	83/1½	83/1½
4%	4%	Do. 4% Deb.	100	97⅛	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93⅛	82½	82½
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7⅛	7⅛
6/-	6/-	Do. 6% Pref.	10	12	10 13/16	10 13/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	1/3	1/3
1/2*	1/2*	Do. 6% Cum. Pref. ..	1	1/16	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67⅛	50⅛	50⅛
1/1½	5d.	Hong Kong Tramway	5/-	7/16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73⅜	44⅜	44⅜
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅛	2/4½	2/1½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 11/16	9 11/16
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	70	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79⅛	70½
9d.*	9d.*	Llandudno & Colwyn B. Ord.	1	—	10/-	10/-
—	1½d.	London & Sub. Traction Ord. ..	1	1/16	2/10½	2/4
6d.	6d.	Do. 5% Pref.	1	1/16	7/3	7/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61	61⅞
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	80	80
5%	5%	Do. 5% Inc. Deb.	100	88⅛	78	78
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	33	33
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7d.%	9d.*	Manaos Trams & Ltg. Ord. ..	1	1/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	70½	67
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71⅛	71⅛
5%	5%	Do. 5% Deb.	100	87	80	80
$1½	$1½	Mexico Trams. Common ..	$100	70	33⅛	33⅛
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	91½	92½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	88½	90½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2*	2/-	National Steam Car	1	1/32	10/7½	20/5
9d.*	9d.*	New General Traction	1	⅛	7/3	7/3
8d.	6d.	Northern Gen. Trans. Ord. ..	1	3/16	13/-	13/-
6/-*	3/-	Para Elec. Rlys. Ord.	5	4⅛	80/3	80/3
5%	5%	Do. 5% 1st Deb. ..	100	89½	77	76
—	—	Pernambuco Tram. & Power Ord	1	—	7/6	7/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/9	12/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7d.*	8d.*	Potteries Elec. Trac. Ord. ..	1	1/16	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	1/16	10/9	10/9
1/4	8d.	Provincial Trams. Ord. ..	1	⅛	19/9	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	76	77½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89⅞	89⅞
5%	5%	Do. 5% Perp. Deb. ..	100	99½	75	73⅞
12/-	10/-	Shanghai Elec. Cons.	10	13	14⅛	14⅛
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/6	4/6
4*	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77⅛	77
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	67½	67½
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	⅜	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21⅞	16	16
—	—	Undgd. Elec. Rys. of London ..	10	21⅛	25/-	30/3
		Do. "A"	1/-	⅛	6/-	6/-
4½%	4%	Do. 4½% Bds. of 1933 Rd. ..	—	99	103	103½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102	102½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	81⅛	83⅛

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Oct. 30	403	423	+ 20	30	13,388	+ 1,127
Aberdeen Corporation ..	,, 31	1,841	1,998	+ 157	22	48,297	+ 5,367
Ayr Corporation ..	Nov. 3	272	323	+ 51	25	13,462	+ 1,284
Belfast City	,, 2	5,777	6,777	+ 1,000	31	197,746	+ 20,786
Birkenhead Corporation	,, 4	1,594	1,818	+ 224	31½	57,395	+ 8,464
Birmingham Corporation	,, 3	14,375	19,424	+ 5,049	31	566,579	+ 56,179
do. Motor Omnibuses ..	,, 3	1,014	1,197	+ 183	31	32,129	+ 804
Blackburn Corporation ..	Oct. 31	1,086	1,325	+ 239	31½	47,844	+ 7,168
Blackpool & Fleetwood ..	,, 27	379	418	+ 39	42	40,260	+ 211
Bournemouth Corporation	,, 31	2,050	2,418	+ 368	30½	81,400	+ 6,106
Bradford Corporation ..	Nov. 3	6,392	7,095	+ 703	31	241,170	+ 23,850
Bristol	,, 2	5,046	5,619	+ 573	44	238,660	+ 21,508
Burnley Corporation ..	,, 3	1,695	1,789	+ 94	..	..	..
Burton-on-Trent Cor. ..	,, 4	287	317	+ 30	31	9,663	+ 871
Bury Corporation ..	,, 4	1,343	1,540	+ 197	31½	52,664	+ 6,309
Chatham & District ..	,, 1	1,234	1,115	— 119	44	50,534	+ 1,891
Cork Electric	,, 1	499	542	+ 43	44	24,246	+ 1,616
Derby Corporation ..	,, 3	1,160	1,207	+ 46	31	37,840	+ 1,537
Dublin United	,, 2	6,251	6,889	+ 638	44	295,638	+ 28,024
Dundee City	Oct. 31	1,370	1,463	+ 93	24½	37,797	+ 2,444
East Ham Corporation ..	Nov. 3	1,269	1,239	— 30	31	43,971	+ 2,340
Exeter Corporation ..	,, 2	387	386	— 1	31	12,841	— 66
Glasgow Corporation ..	,, 3	23,786	26,459	+ 2,673	22½	591,383	+ 66,909
Glossop (U.E. Sup. Co.) ..	,, 3	146	164	+ 18	44	6,760	+ 692
Halifax Corporation ..	Oct. 30	1,875	2,209	+ 334	31½	77,652	+ 6,371
do. Motor Buses ..	,, 30	48	50	+ 2	31½	1,496	— 59
Hastings and District ..	Nov. 4	808	1,108	+ 300	44	55,593	+ 8,682
Huddersfield Corporation ..	,, 3	2,723	3,033	+ 310	31	103,013	+ 9,006
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	Nov. 3	651	690	+ 39	31	24,081	+ 2,406
Ipswich Corporation ..	,, 3	440	613	+ 173	27	22,011	+ 5,040
Isle of Thanet	,, 3	286	151	— 135	5	864	— 646
Kilmarnock Corporation	,, 3	169	199	+ 30	24½	4,879	+ 457
Lanarkshire	,, 1	2,312	2,774	+ 462	44	121,687	+ 19,459
Lancashire United ..	Oct. 31	1,796	2,341	+ 545	44	103,198	+ 22,331
Leeds City	Nov. 3	9,641	10,739	+ 1,098	31	344,568	+ 35,072
Leicester Corporation ..	,, 3	3,435	3,864	+ 429	..	..	..
Leith Corporation ..	,, 3	864	1,025	+ 161	24½	26,810	+ 4,707
Leyton U.D. Council ..	,, 1	1,520	1,701	+ 181	31	59,081	+ 6,145
Liverpool Corporation ..	,, 3	14,321	15,964	+ 1,643	43½	682,399	+ 61,359
Llandudno & Colwyn Bay	Oct. 26	255	271	+ 16	47½	16,855	— 962
London County Council	Nov. 7	46,549	54,084	+ 7,535	31½	1,758,384	+ 216,974
Maidstone Corporation ..	,, 1	196	217	+ 21	31	7,740	+ 711
Manchester Corporation	,, 3	18,641	20,762	+ 2,121	31	642,242	+ 50,477
Nelson Corporation ..	,, 3	198	242	+ 44	31	7,390	+ 582
Newcastle-on-Tyne Cor.	,, 3	6,998	7,044	+ 956	31	243,709	+ 34,679
New St. Helens & Dist. ..	Oct. 31	1,056	1,188	+ 132	18	27,434	+ 6,846
Northampton Cor. ..	Nov. 2	735	851	+ 116	31	26,091	+ 3,678
Nottingham Corporation	,, 1	3,859	4,544	+ 685	31	136,826	+ 13,459
Oldham Corporation ..	,, 4	2,347	2,750	+ 404	32	91,604	+ 10,550
Portsmouth Corporation	,, 3	2,404	2,676	+ 272	..	..	..
Provincial	,, 3	2,046	2,314	+ 268	4½	11,452	+ 877
Reading Corporation ..	,, 1	904	1,120	+ 216	31½	32,837	+ 5,887
Rhondda Tramways ..	Oct. 25	1,375	1,577	+ 202	43	64,391	+ 9,025
Rotherham Corporation	Nov. 7	1,629	1,930	+ 301	31½	57,049	+ 7,573
Salford Corporation ..	,, 5	5,401	6,622	+ 1,221	31½	208,043	+ 33,354
Sheffield Corporation ..	,, 4	10,588	12,352	+ 1,764	32	383,913	+ 44,790
Southampton Cor. ..	Oct. 31	1,771	2,151	+ 379	30½	63,250	+ 10,551
Southend-on-Sea Cor. ..	,, 31	699	583	— 116	31	30,698	— 919
South Shields Cor. ..	,, 13	854	926	+ 72	15	27,042	+ 3,009
Sunderland Corporation ..	Nov. 4	1,631	1,837	+ 206	31	57,129	+ 5,022
Sunderland District ..	Oct. 17	726	854	+ 128	51	36,869	+ 5,145
Swindon Corporation ..	,, 24	199	258	+ 59	29½	8,188	+ 1,973
Torquay Tramways ..	,, 25	519	691	+ 172	43	28,762	+ 2,409
Tynemouth Trys. & Trmrds	,, 24	610	787	+ 177	17	11,858	+ 3,875
Wallasey Corporation ..	Nov. 2	1,221	1,410	+ 189	31½	50,696	+ 5,944
Walsall Corporation ..	,, 3	814	1,010	+ 196	31	30,458	+ 4,020
Walthamstow U.D. Coun.	,, 3	1,002	1,089	+ 87	31	39,230	+ 3,880
Warrington Corporation	Oct. 25	509	570	+ 61	30	16,209	+ 1,313
West Ham Corporation ..	Nov. 1	3,160	3,253	+ 193	30½	113,701	+ 11,860
Wigan Corporation ..	Oct. 31	1,697	2,087	+ 380	31	61,496	+ 8,745
Yorkshire (West Riding)	Nov. 4	1,801	2,221	+ 420	44	93,365	+ 15,781

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War :—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Nov. 4	£53,120	£56,328	44	£2,274,569	+ £30,906
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,882
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Sept.	7,138,000	7,625,000	39	68,430,000	+ 5,270,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Sept.	414,811	457,709	13	1,350,512	+ 100,116
Buenos Aires Lacroze ..	Oct.	39,670	39,067	17	149,879	— 1,737
Burmah Tram. & Light Rs.	Sept.	23,749	26,168	8	52,882	+ 4,720
Calcutta .. .. Rs.	Nov. 3	68,695	57,465	44	2,995,752	+ 15,580
Cape Town	Aug.	13,391	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Oct.	2,539	2,805	43	41,210	+ 16,071
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Oct.	2,080	1,229	13	4,303	— 2,852
Hong Kong .. .. $	Sept. 15	16,525	13,817	37	499,566	— 41,661
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Oct.	4,434	4,069	43	40,615	— 1,441
Lima	Sept.	33,340	35,621	39	322,195	+ 18,107
Lisbon .. .. Escu	Sept.	194,276	228,097	..	..	..
Madras .. .. Rs.	Oct. 31	31,819	35,418	43	696,215	+ 32,305
Manila .. .. $	June	59,432	73,000	..	..	..
Manaos .. .. Rs.	July	152,380	162,157	..	..	..
Montevideo	Sept.	26,711	29,426	48	329,679	+ 10,636
Pernambuco	Oct. 28	3,166	4,194	42	163,170	+ 32,635
Peruvian .. .. $	Oct.	945,500	1,047,220	17	3,952,390	+ 365,560
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Oct.	5,043	5,667	43	50,021	+ 3,650
Shanghai .. .. $	Aug. 22	21,712	22,360	..	..	..
Singapore .. .. $	Sept. 22	12,404	12,384	38	490,868	+ 19,356
Toronto .. .. $	Sept.	913,535	1,023,517	39	8,891,112	+ 885,848
Winnipeg .. .. $	Sept.	267,497	267,170	39	2,431,704	— 29,660

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

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TRAMWAYS ON BRIDGES OF REINFORCED CONCRETE.

TWO EXAMPLES IN LONDON.

Municipal bodies, until comparatively recent times, have been chary of using reinforced concrete in many of their structures. The success of this concrete depends essentially upon constant, careful, expert, and reliable supervision throughout the preparation and erection of the material. This was not always available. Moreover, in the case of structures serving street tramways the fitting of the forms *in situ* caused such a lengthy obstruction to traffic that ready-made parts of steel were preferred. The three following examples are interesting, the first from its novelty, the second as the first structure of its kind carrying a tramway in London, and the third because of the small amount of obstruction to traffic during the work, owing to the "pre-casting" of the ferro-concrete members of the bridge.

The first highway bridge in London constructed of reinforced concrete is the single 32-ft. span, Whiston Street Bridge, Shoreditch, over the Regent's Canal. There is, however, no tramway over this structure. It was built by the Shoreditch Borough Council's engineer, Captain T. H. Hustler, against considerable opposition. The bridge works were let to Messrs. Higgs and Hill, Limited, South Lambeth, and the plans and specifications, on the Hennebique system, were prepared by Messrs. L. C. Mouchel and Partners. The construction was begun in 1910, and the bridge was tested and passed on April 13, 1911. It superseded an old one of brickwork and cast-iron, and many large gas-mains and electrical cables had to be kept intact during the reconstruction.

Two years later, on May 5, 1913, the construction

Fig. 1.—London County Council Double-Deck Car Crossing New North Road Ferro-concrete Bridge.

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of a more important bridge was started by the same firms. This carries the New North Road, Shoreditch, over the Regent's Canal Dock, and took the place of an old semi-elliptical, two-ring, brick arch bridge 25 ft. wide, with a span of 25 ft. 6 in. The new bridge, which is shown in Figs. 1 and 2, is a single 43 ft. 6 in. span 53 ft. wide, and carries a double line of the London County Council Tramways. To provide space for these tracks the span was increased by 18 ft. and the width by 20 ft.

The New North Road is an important link in the alternative route from the East of London to the

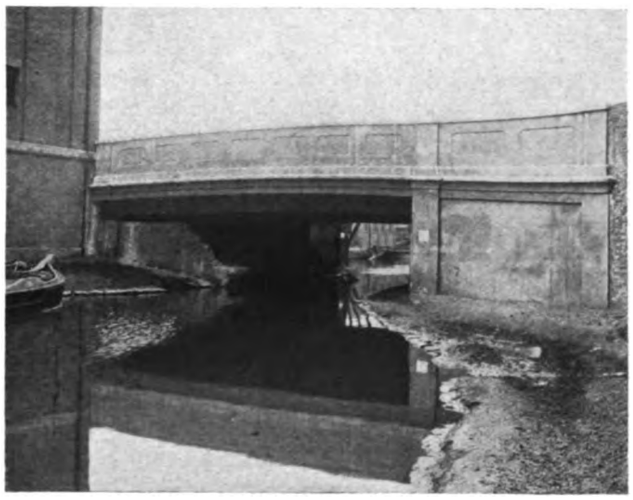

Fig. 2.—New North Road Ferro-concrete Bridge.

Great North Road at Highbury, and the traffic on it is very heavy. Under the footways there are many mains and room for more. Those now laid consist of 24-in. and 18-in. water-mains, a 4-in. gas-main, a 3-in. post office telegraph main, and a 6-way electric cable

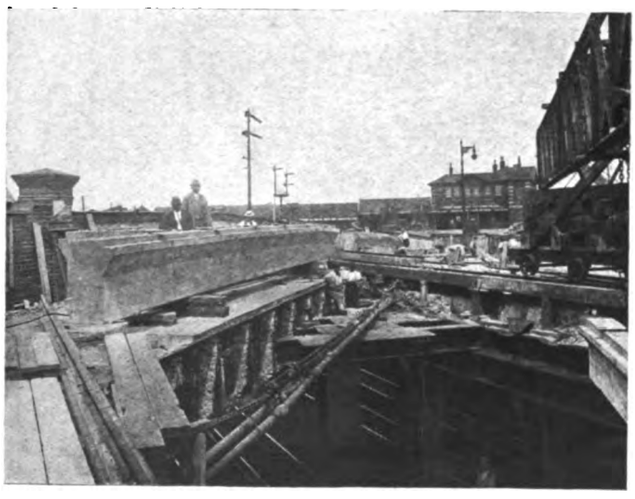

Fig. 3.—St. John's Hill Bridge—Beams Ready to be Lowered.

conduit. The maximum load to be carried is 32 tons on a 6 ft. 6 in. by 8 ft. wheel-base. The bridge, which is on the skew, consists of 11 longitudinal and four transverse beams; these are stopped at either side of the tramway conduit in order to form a continuous trough. The parapets are 8 ft. deep, and form girders which add greatly to the strength of the structure. The abutment and wing walls are of ferro-concrete, 14 ft. 6 in. to 17 ft. high, made of vertical slabs 7 in. thick, stiffened by columns and counterforts. The construction is monolithic, and is so reinforced as to transfer to the steel all tensile stresses. The total load of the engine and wagon was 40 tons, or 10 tons more than the specified test; under this the maximum deflection was one-twelfth of an inch, or one-tenth of

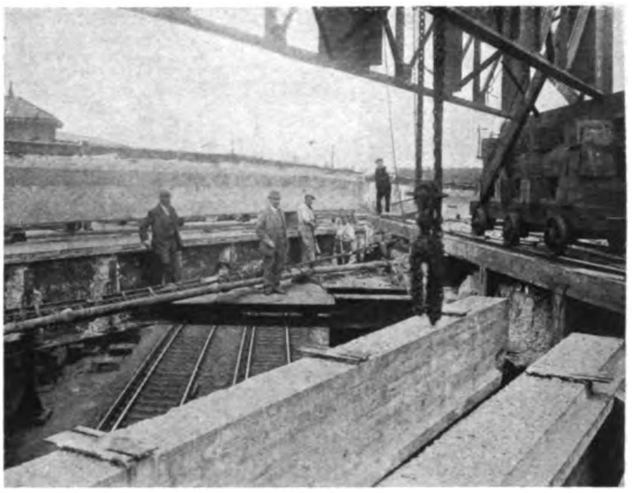

Fig. 4.—St. John's Hill Bridge—Showing a Ferro-concrete Beam Just Lowered.

the permissible deflection specified. The bridge was tested and opened by the Mayor on May 28, 1914.

A third, and still more important bridge, is that at Clapham Junction over two tracks of the London and South Western Railway; it is one of the spans of St. John's Hill bridge, carrying the Wandsworth Road and its tramway over the many railway lines at that

Fig. 5.—St. John's Hill Bridge—Showing Gantry Used to Place Ferro-concrete Beams in Position.

station. St. John's Hill forms with Lavender Hill a continuation of Wandsworth Road, connecting at its western end with East Hill and High Street, Wandsworth. This is the first reinforced concrete bridge constructed for the London County Council, and is also

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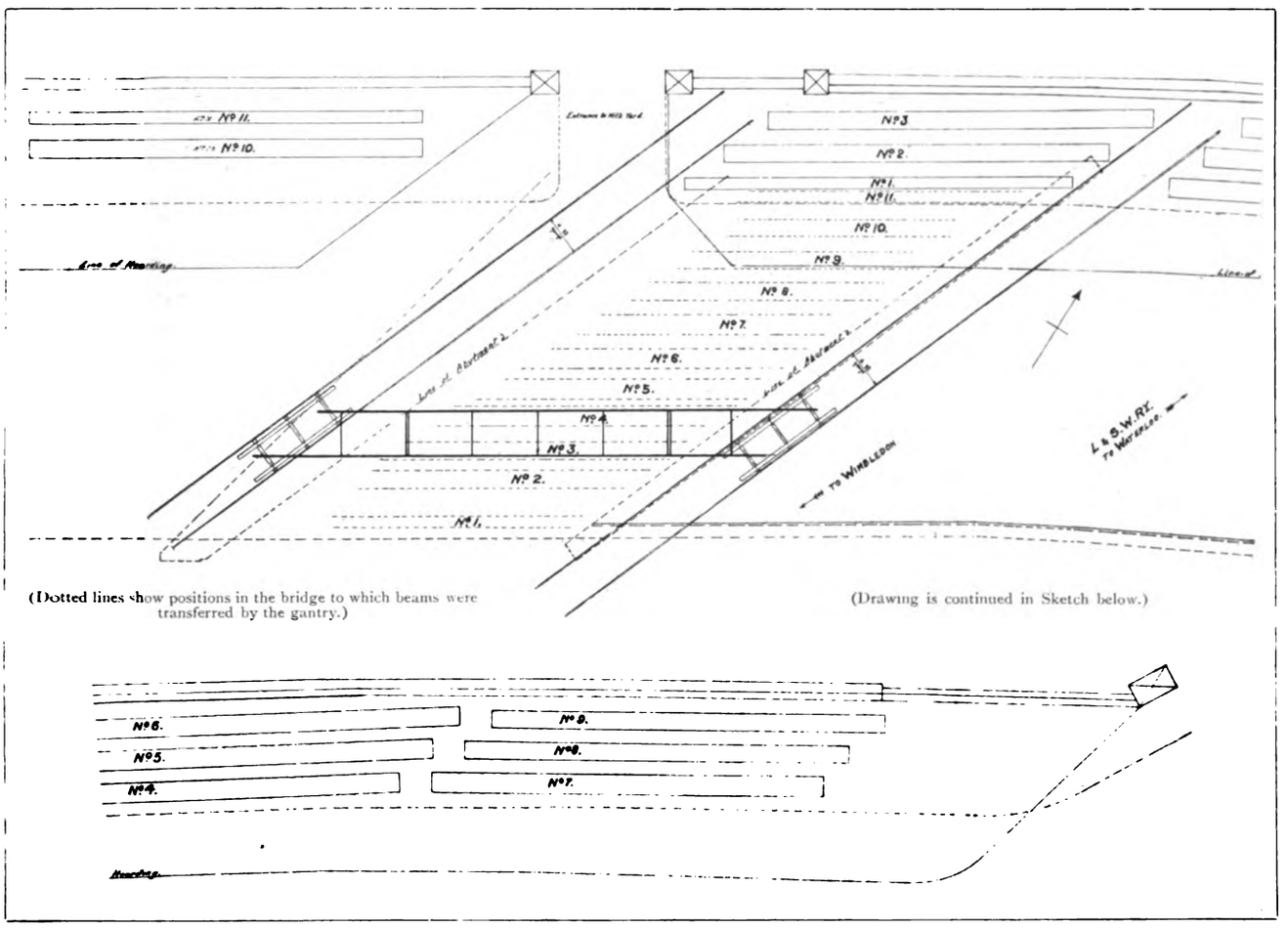

(Dotted lines show positions in the bridge to which beams were transferred by the gantry.)

(Drawing is continued in Sketch below.)

Fig. 6.—Lay-out of Concrete Beams during Casting and Gantry Run.

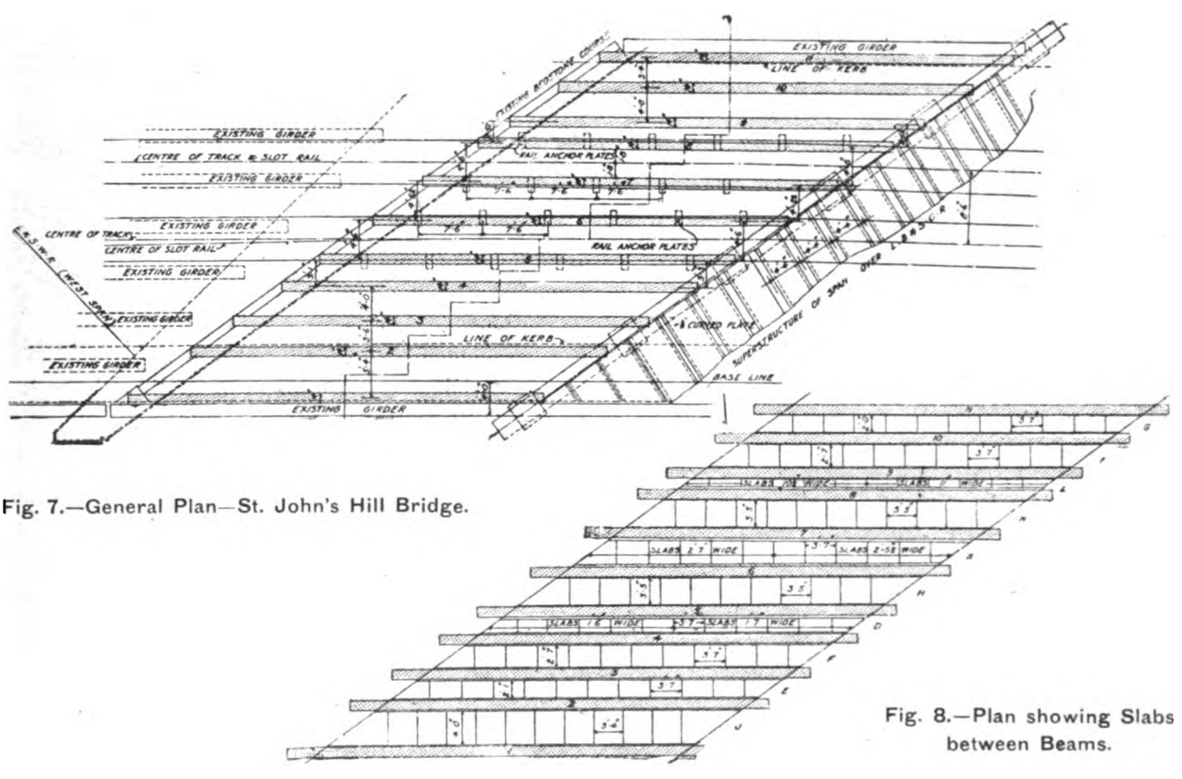

Fig. 7.—General Plan—St. John's Hill Bridge.

Fig. 8.—Plan showing Slabs between Beams.

St. John's Hill Bridge, Clapham Junction.

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original in that the parts of the superstructure were not moulded in place but were "pre-casted." This moulding of parts before placing them in position possesses several advantages, and is being rapidly adopted in many places. It ensures closer supervision when the work is an extensive one, and consequently better and more reliable quality, an important factor in all ferro-concrete structures. Moreover, it enables the parts to be placed in position ready to bear their respective loads, and therefore with a minimum of delay after the structure has been made ready for them. This advantage was of supreme importance in the work under review; for an old superstructure had to be replaced by a new one with as little delay and inconvenience as possible to the important traffic over it, and where no false work could be erected on the running lines underneath, so that everything had to be done from above. The converted span of the bridge consisted of steel girders and decking crossing the rails at an angle of 34 deg. Half the superstructure under one track of tramrails was converted at a time. The necessary diversions of the rails and street traffic at each end of the span left a space which was utilised as a yard in which the girders, slabs, and decking were all moulded and seasoned, while the old work was being removed. The span is about 50 ft. long, on the skew, and 32 ft. 6 in. wide—with a double tramway line and a new footpath 6 ft. 6 in. wide on one side, the old path, lately reconstructed, being left on the other. The superstructure (Figs. 7 and 8) consists of eleven ferro-concrete beams 48 ft. long, 3 ft. 7 in. deep, 26 in. wide near the top, and 16 in. at the bottom (Figs. 9 to 13). At the west end the main beams rest on the old bedstone course; at the east end they are carried by a stringer steel girder forming part of the bridge over the London, Brighton and South Coast Railway. The beams are rebated at the top to receive the slabs. These vary in width according to their position, as shown in the plan in Fig. 8; they are 3 to 4 in. deep, and the whole floor is covered with a 2-in. coat of reinforced concrete. The bars are embedded in the concrete, and rails are bolted to the plates with a half-inch teak packing in between. The tramrails are anchored to the main beams as shown in Fig. 9. The roadway, with the granite kerbs and the 3-in. York stone sidewalks, is formed on top of the covering coat, and is paved with 5-in. wood blocks.

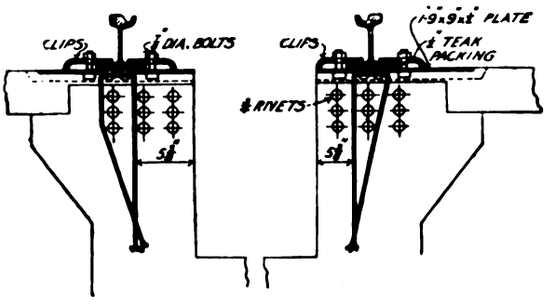

Fig. 9.—Anchorage for Tram Rails.

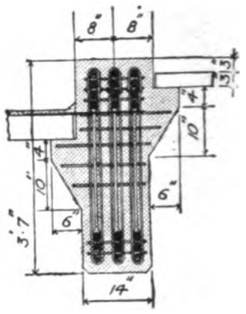

Fig. 10.—Main Beam Section.

The main beams are amply reinforced by longitudinal bars, the number of which varies slightly with the calculated bending moments, as seen in Figs. 11 and 12. The bars are securely anchored at the ends, and the web stresses are taken up by the diagonally bent-up ends and by the vertical stirrups and transverse bars. The reinforcement of the slabs and of the top covering

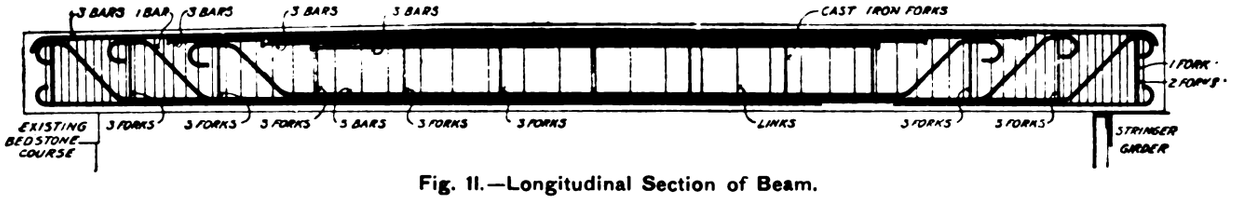

Fig. 11.—Longitudinal Section of Beam.

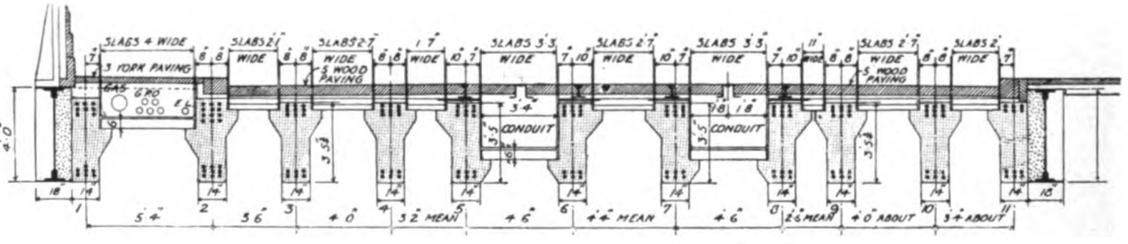

Fig. 12.—Section A A on General Plan, Fig. 7.

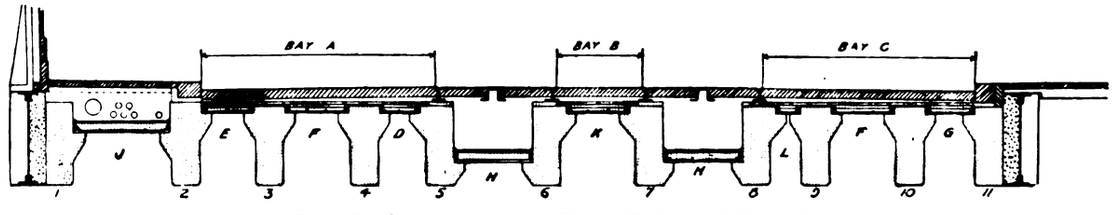

Fig. 13.—Section showing Beam Slabs and Conduits.

present no special features. Three ferro-concrete conduits are provided, as shown in Figs. 12 and 13. The sides are formed by the main beam, and the bottom by reinforced slabs supported by brackets on the sides of the beams. The conduit on the left, for the different mains, is 4 ft. wide by 16 in. deep. The two for the tramline conductors are 3 ft. 4 in. wide by 27 in. deep.

The work was started by the contractors, Messrs. Holloway Brothers (London), Limited, Grosvenor Road, in February, 1917, their engineer, Mr. W. H. Stacey, having charge of the work. Messrs. Holloway Brothers prepared a special travelling gantry for

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handling the 15-ton girders. This runs on two six-wheel trucks, as shown in Fig. 5, and the general lay-out can be plainly seen on the plan, Fig. 6. When the first lot of beams had been placed in position the hoarding was shifted across the road, which was entirely blocked while the last beams were lowered into position. These were brought up to this place by mounting them on little lorries and hauling them along by a chain and tackle. On the lay-out plan the beams in full lines show where they were cast, and the dotted lines with similar numbers where they were eventually placed.

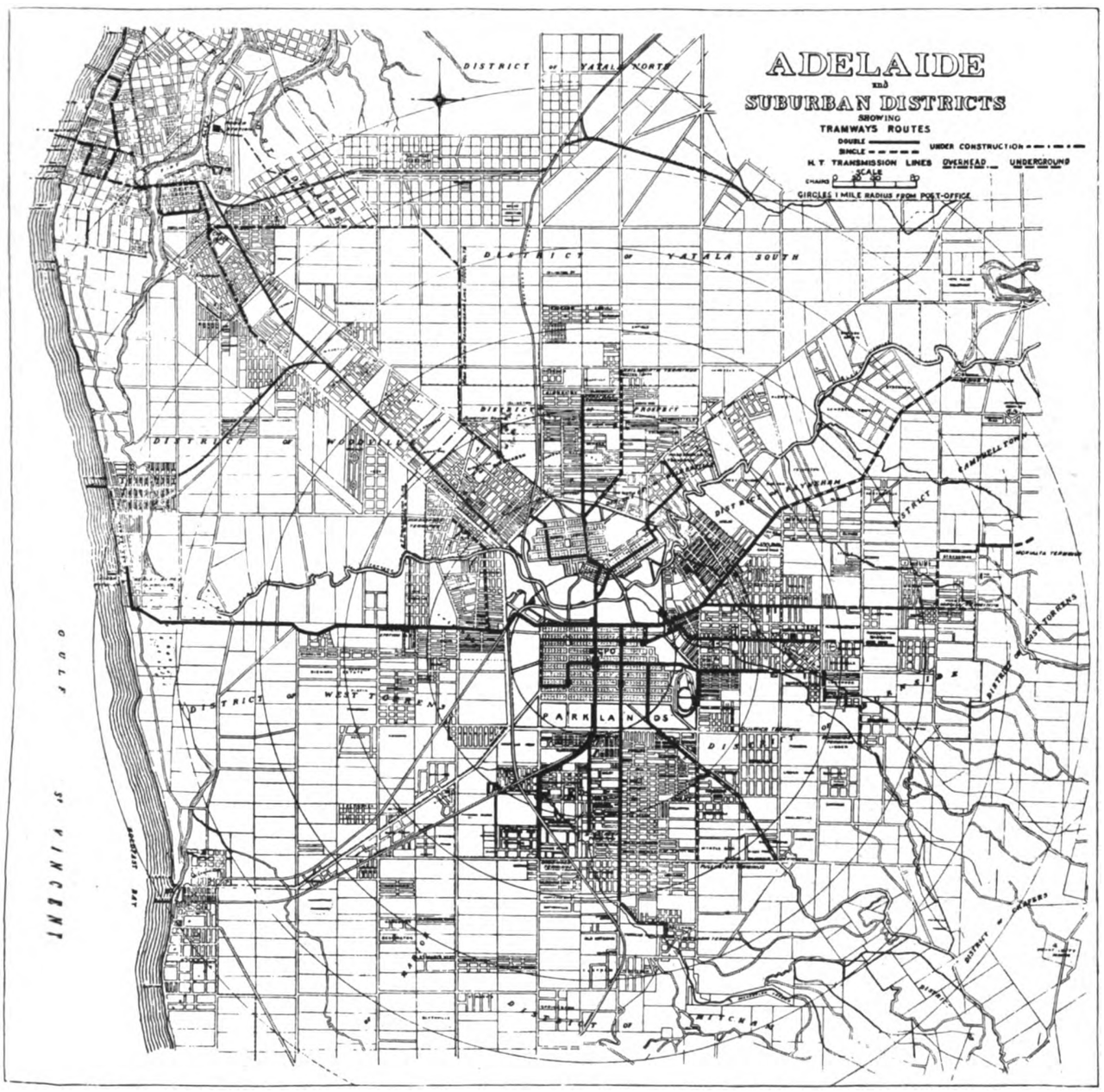
The ferro-concrete details were worked out by Messrs. L. G. Mouchel and Partners, Limited. The chief engineer of the London County Council, Mr. G. W. Humphreys, M.Inst.C.E., was the responsible officer, and his assistants were Messrs. W. C. Copperthwaite, M.Inst.C.E., and C. Beecher. The structure was thoroughly tested with highly satisfactory results on July 15, 1917. The test load consisted of two 20-ton service vans, close coupled, on the tramway line over beams 5 and 6. A sensitive deflectometer registered only 4 mm., and the vibrometer showed no vibration but only a gradual deflection.

ADELAIDE MUNICIPAL TRAMWAYS.

It is now some years since the Adelaide Municipal Tramways Trust came into existence, but it was not till October, 1914, that the last horse-car disappeared and electric traction became universal. The system, as will be seen from the accompanying map, includes some long suburban lines. Last year the total route length was 54½ miles, of which 34½ miles are double track and 20 miles single. Additional lines were under construction.

The financial year of the Adelaide Tramways Trust ends on July 31, so that the figures for the past year are not yet available. Those for the year ended July, 1916, are of interest, and the revenue showed substantial increases when compared with previous years. The gross earnings were £322,759, while the working expenses were £193,965, or 60 per cent. of the revenue. This was the lowest ratio on record for the undertaking. The revenue was earned with a stock of 170 cars, from which it may be inferred that on some of the routes a comparatively infrequent service is necessary.

As in "new" countries generally, the cost of most things is higher than it is at home. It is consequently


ADELAIDE
AND
SUBURBAN DISTRICTS
SHOWING
TRAMWAYS ROUTES
DOUBLE
SINGLE
UNDER CONSTRUCTION
H.T. TRANSMISSION LINES OVERHEAD UNDERGROUND
SCALE
CHAINS
CIRCLES 1 MILE RADIUS FROM POST-OFFICE
DISTRICT OF YATALA NORTH
DISTRICT OF YATALA SOUTH
DISTRICT OF WEST TORRENS
PARKLANDS
PARK LANDS
DISTRICT OF HINDMARSH
DISTRICT OF PORT ADELAIDE
DISTRICT OF ENFIELD
DISTRICT OF MITCHAM
DISTRICT OF BURNSIDE
DISTRICT OF KENSINGTON
DISTRICT OF PAYNEHAM
DISTRICT OF ST PETERS
DISTRICT OF ST MARYS
DISTRICT OF UNLEY
DISTRICT OF BROWNHILL KEW
DISTRICT OF ADELAIDE
PORT ADELAIDE ROAD
PORT ROAD
PORT WAKEFIELD ROAD
GAWLER ROAD
GLYNBURN ROAD
MAGILL ROAD
KENSINGTON ROAD
KING WILLIAM ROAD
HUTT ROAD
HOLBROOKS ROAD
TORRENS ROAD
GOODWOOD ROAD
MARION ROAD
HENLEY BEACH ROAD
GRANGE ROAD
PORT ADELAIDE TRAMWAY
TRAMWAY TO GLENELG
TRAMWAY TO MITCHAM
TRAMWAY TO MAGILL
TRAMWAY TO KENSINGTON
TRAMWAY TO PAYNEHAM
TRAMWAY TO ST PETERS
TRAMWAY TO UNLEY
TRAMWAY TO BROWNHILL KEW
TRAMWAY TO HENLEY BEACH
TRAMWAY TO GRANGE
TRAMWAY TO PORT ADELAIDE
TRAMWAY TO TORRENSVILLE
TRAMWAY TO HINDMARSH
TRAMWAY TO ENFIELD
TRAMWAY TO GAWLER
TRAMWAY TO PORT WAKEFIELD
TRAMWAY TO HOLBROOKS
TRAMWAY TO GLYNBURN
TRAMWAY TO HUTT
TRAMWAY TO TORRENS
TRAMWAY TO GOODWOOD
TRAMWAY TO MARION
TRAMWAY TO KING WILLIAM

not surprising to find that for the year ended July, 1916, the receipts equalled 16·367d. per car-mile, while the working expenses stood at 9·866d.

Mr. W. G. T. Goodman, who is now on a visit to this country, has been the general manager and chief engineer of the undertaking since its inception, and was responsible for the whole of its equipment, including track, power installation, and rolling stock. The electric tramway system which he has gradually built up is not only a credit to himself personally, but is an enterprise that is of immense importance to the city, and proves how thoroughly the authorities of Adelaide are dealing with their transport question.

In a later issue we hope to describe the undertaking in detail, but we may here touch on a few points that are of particular interest at the present time. Like other tramways the world over, the undertaking has suffered a good deal from rail corrugation, and appropriately enough that Australian invention which is proving of such service at the present juncture in this country, the Woods-Gilbert rail planer, was employed to remove the evil. At that time (1915) the ingenious machine was little known in this country. Down to the middle of last year some 100,000 feet of rail on the Adelaide tramways had corrugations removed by the Woods-Gilbert machines, and Mr. Goodman reported that their use had obviated the necessity of re-laying a considerable length of track.

The last report, which covers a period of two years, refers among other things to considerable additions to sub-station plant required by developments of the system. A peculiar feature is the fact that the reserve for renewals is statutory, a percentage having to be set apart annually to the fund. Another interesting item is to be found in agreements with the Harbours Board and the Commissioners of Waterworks (which are Government departments) for the supply of electric power to their workshops.

The attempts which have been made to establish motor omnibus services in Adelaide have not yet been successful. The Trust ordered some of Daimler make in July, 1914, but owing to war work the Daimler Company could not give delivery, and the contract was cancelled. A motor omnibus company started operations in 1915, but owing to lack of support it was forced into liquidation, and the vehicles were withdrawn in March, 1916.

Adelaide tramway staff at the time of the report numbered 1,130. The high sense of national duty shown by the whole service was very gratifying. The generous action of the Trust in making up the difference between military pay and the rates paid in the tramway service proved a great stimulus to the recruiting movement.

GOODS TRAFFIC ON TRAMWAYS.

Councillor Cheetham, chairman of Oldham Tramways Committee, has reported to that body on several points raised at the Municipal Tramways Conference. In reference to the carriage of goods by tramways, Mr. P. Priestly, the general manager, said that in Oldham it would probably mean the laying of new lengths of rail and the provision of suitable vehicles. He had gone into the matter in regard to one or two industries, and had formed the conclusion that it would be possible to cultivate a tremendous amount of new traffic along the lines hinted at. The chairman said that if the tramways could secure the carrying of a considerable part of the merchandise from Manchester to Oldham a saving would be made in the cost of repairing the roads, which were damaged by heavy motor vehicles.

Dundee Tramways Committee have considered representations made by Mr. Peter Fisher, general manager, on the result of the discussion on goods carriage at the Municipal Tramways Conference. Mr. Fisher put the two governing facts of the question as follows:—(1) That electric haulage can be effected at a third of the cost of horse haulage; (2) that most of the equipment for it exists and lies idle during a large part of the day, which means a waste of capital expenditure.

MAKING A MOTORMAN OUT OF AN ENGINE-DRIVER.

In the United States that important and highly skilled workman whom we call a railway engine driver is described as a locomotive engineer. Hence the title of an interesting paper, "Making an Electric Locomotive Engineer out of a Steam Locomotive Engineer," by Mr. W. F. Coors, which appears in the American *General Electric Review*. Mr. Coors is a member of the staff of the railway and traction engineering department of the General Electric Company, and has had much experience of the process of changing men from being drivers of steam trains to drivers of electric trains. Some English railway companies which have converted parts of their lines from steam to electric traction have had similar experience, but generally in their case multiple-unit electric trains are used instead of electric locomotives. As is well known, some of the latter now running in America are more powerful than any steam locomotive. After the war, if we then extend railway electrification, the electric locomotive may be more largely used in this country than it now is. Meantime the following summary of Mr. Coors' article cannot fail to be interesting.

In the case of conversion from steam to electric traction, as soon as the electric locomotives are in operation all objection by the engine crews to heavy trains ceases, there being no difference in their work whether they have forty or a hundred cars in a train. Under steam operation methods the locomotives may be changed every division of 110 miles. But when the motors take hold of a train they stay with it for at least two divisions, and the crews make a "main line change" at the intermediate division point. The running time over the old divisions may be shortened from twelve to eight hours, and so even the crews may look favourably on the motors.

Many of the train operating men are sceptical about their chances of escape in case of a wreck when the trolley wire may get down on the ground or cars and electrocute the whole personnel, leaving the train to run wild. This condition looks easily impossible to the electrical engineer, but it is not easy to explain away from the minds of men who have never had any experience with electricity. From this standpoint alone the old operatives are preferable to men who have had a little experience with low-voltage circuits, just enough to be foolhardy with higher voltage. The steam men know nothing about "juice"; they admit it and are ready to go to extreme precautions before undertaking the handling of any electric apparatus whether energised or not.

It is significant that in a recent large electrification only a few serious accidents have occurred, and that none of these has happened to the men operating the trains: the very men, in fact, who had never handled electric energy before, and who perhaps have the major part of this work to do in actual operation. Pantographs have been wrecked and tangled in the overhead work, steam locomotives have caught and torn down the wire, snow slides have taken out long stretches of pole-line, and, in rare instances, the wire has broken and dragged on the roofs of the steel passenger cars; yet with all these troubles nothing more than a slight scare of the witnesses has occurred.

It was a little difficult for the engineers to realise just how important the trolley wire and pantographs were, until they had an accident or two involving these equipments. In the early stage of their learning they were intent on the operation of the locomotive only, and if they were headed by a careless switchman

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into a track which had no trolley wire it was ten chances to one that they would take the signal and back right into it only to discover that they had a dead motor and couldn't get back to the wire again, or the pantograph had been caught and smashed against the overhead span wires. However, with a little experience of this kind it soon became second nature for the men to watch the trolley wire almost as much as the track.

The men have been instructed never to go on top of the locomotives or to open any covers over electrical apparatus in the locomotive with either of the pantograph current collectors up against the wire. Each locomotive is equipped with a long pole hook and dry rope which can be used to pull a pantograph out of a wire entanglement, and in rarely bad cases the power is cut off at the sub-stations by request from a portable set attached to the despatcher's telephone circuit and the line grounded at the motor. Since there are two pantographs on each machine, it is comparatively easy to disconnect one which is damaged and to use the other one in operation. The trouble from this cause rarely occasions a delay of more than thirty minutes.

On the electric locomotive the engineer is located at the " front of things," and many of the men at first wondered what would be left of them in case of a head-on collision. Several accidents, in which with steam engines the men admit their chances would have been slim, have demonstrated that the electric locomotive cab construction and arrangement take very good care of them in such emergencies. The unobstructed front view not only gives the men a chance for earlier warning and more time to apply air brakes at the prospect of a coming collision, but also they can take steps " to unload " themselves, and get out of danger. There have been cases where these machines have run into landslides and rolled down embankments without injuring the men at all. There are no steam-pipes to burst, no red-hot fire-boxes with gas and smoke to overwhelm the men, and no tender with flying coal to crash into the cab.

The operating men on this electrification regard the whole arrangement as a success. The shorter working hours, the cleanliness of the surroundings at work, little on the locomotive requiring close attention, less danger involved, no anxiety as to whether they have enough coal or water, increase in pay, and confidence in the equipment through a thorough knowledge of its operating details, have won many friends to the electric locomotives from the men who use them. The men were very receptive of all instructions given them.

The first division was put under electric operation as soon as several motors arrived from the factory. Men were sent out by the manufacturer as instructors to ride with each and every new engineer until he should be sufficiently qualified to operate alone. The factory men were called out by the regular call-boy who summoned the train crews to duty. Lists of men who were " qualified " by the instructors were posted in all conspicuous places. It cannot be said that the younger men were exclusively able to qualify quicker than the older ones, but such was generally true. However, from an instructor's point of view, when one of the older men did express his confidence in himself, and showed sufficient progression, there was no need to worry about him later, while the men who had recently been " set up " from firing were likely enough to call for help over the dispatcher's telephone when out in the middle of their run.

Since the air brakes were practically identical to those used in steam practice, this feature tended towards greater confidence in the engineer.

On the succeeding three divisions, instruction work was much easier. The men would talk over the new machines among themselves, and their various experiences with each particular feature, so that much instruction work could be briefly passed over. The railway company placed a " caboose " at the instructor's disposal at terminals for an instruction car, and the men after being out on the road were very willing to drop in for a few minutes to talk and become acquainted with the motor blue-print wiring diagrams, and learn just what operation details were necessarily required. Later, instruction books were prepared and distributed to each engineer for home study, and to their credit it may be said that the books proved to be a valuable aid to the instructors, who it seemed at first had tackled an endless job. By these means the period of actual road instruction per man was cut down from one to two weeks to a maximum of five days, and in many cases to only two days.

Passenger engine crews were given more work in learning than the freight men, since on through-runs there was little opportunity to show up the " fine " points to be learned. These men usually had a half-day off every other day, and came to the round-house, where an instructor would purposely remove fuses on a spare locomotive, put match stems in the relays, and cause a multitude of troubles for the engineers to locate and remedy.

The technical terms used by the electrical engineer for apparatus and electrical quantities are readily taken up by the steam man where they are not confusing or where one term for the same thing is strictly adhered to. It is easy to explain the difference between kilowatts and kilowatt-hours to the beginner, but the various indefinite distinctions *drawn* by technical men between potential, tension, and voltage—for example, when referring to electric pressure—are not readily received by operating men who are told that such pressure is measured in *volts*, and who therefore are prone to conclude that the proper term should be " voltage " and that exclusively. While water and air pipe analogies are useful in explaining direct-current actions, they fail on practical hearers when alternating current is dealt with. Steam, water, and air valves when *open* permit the flow of current, while electric switches and contactors permit the flow of current when *closed*; so the old steam man must be excused sometimes if he wonders what a set of instructions or wiring diagrams mean if these terms are used indiscriminately or if they sometimes allude to contactors as *switches* or relays as *regulators* depending on the purpose for which they are utilised. He can only judge from the external appearances when beginning, and if such a piece of apparatus on the electric locomotive is called one thing in one location, and a similar affair is called something entirely different when in another location, it can only mean an extended length of time before the steam locomotive engineer can become qualified for electric locomotive operation.

Successful Fare Revision at Croydon.—Mr. T. B. Goodyer, manager of Croydon Corporation tramways, has presented to the Council a report on the financial working of the new fare stages. The increase in the figures for the year ended August 12, 1917, compared with the average figures for the four preceding years, is as follows :—

	Increase.	Per cent.
Gross receipts	£11,728	13·33
Receipts per car-mile	3·01d.	37·72
Number of passengers	928,416	4·67
Average fare per passenger	·088d.	8·28

In the special report submitted to the Council on July 3, 1916, it was estimated that the revised charges would produce an increase in gross revenue of at least 8 per cent. The annual increase of 13·33 per cent., as set out above, is a result which the Council will no doubt regard as thoroughly satisfactory.

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LONDON, NOVEMBER 15, 1917.

The Dover Accident.

Tramway authorities and members of Military Tribunals ought specially to note two statements in the report of Colonel Pringle on the Dover accident. The first is that the motorman was discharged from the army owing to a nervous breakdown, and that in the judgment of Colonel Pringle such a man is unlikely two months later to be fit to drive a car on a difficult route. At all events, adds the inspector, medical evidence should be sought before candidates of this description are accepted. The case emphasises the contention widely held before the war that there should be a medical examination of every man who seeks to become the driver of a public vehicle. This wise provision already obtains in some of the more important undertakings. Apparently with the idea of making some concession on account of the impossibility of obtaining suitable men at this juncture, the inspector limits his remark to those who are to be employed on difficult routes. This would seem to indicate a belief that men discharged for the reason referred to are not altogether unsuitable, but with the Dover mishap in mind managers would be well advised if they leave the question to the decision of a medical man. They will gain no help from a perusal of last year's Report of the Home Office Committee on the subject of utilising partially disabled men as drivers of tramcars and omnibuses. The question of nervous disability did not enter into the Committee's deliberations, which were concerned solely with deficiencies in limbs. A man's behaviour during his period of training may not in every case settle the question whether he will be able to retain his nerve in an emergency. Many a driver who has never gone through the nerve-shattering experiences of soldiers at the front has lost his self-possession in circumstances similar to those of the Dover accident. The failure in that case may have been to some extent due to the driver's unfamiliarity with the rheostatic brake, which it appears he had only used on one occasion. Upon this point Colonel Pringle makes a representation that calls for attention on the part of managers. The other observation to which reference may be made is the inspector's expression of doubt as to whether Tribunals are aware of the difficulties of finding suitable substitutes for motormen who are taken for the army. That remark might be brought to the attention of the new Director of National Service by the Tramways Associations. Another desirable step is that the Board of Trade should consult with the specialists who have the care of soldiers whose nerves have been shattered, and in such consultation Sir John Collie, consulting physician to the London County Council, might be included.

Safety First—A Mistaken Attitude.

Two weeks hence the London Safety First Council complete their first year of existence. In briefly reviewing the formation and work of the Council, several considerations claim attention. The first is the providential aspect of the movement at a period when the restricted lighting had increased the dangers of the streets. The fatalities arising therefrom in London alone before the war had exceeded the annual aggregate of air raid deaths for the whole country, as the Home Office have pointed out. In any other European country an ameliorative movement would doubtless have come from an official department, but it is customary for Britons to work out their own salvation in matters affecting

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the public weal. In this instance, however, the Local Government Board must be given credit for assisting by their permission to the Metropolitan local authorities to aid the movement financially to the extent of five pounds per annum. To attempt to launch the scheme required the initiative of a man of enthusiasm at a period of unprecedented difficulty; one who could speak with the knowledge of experience of what such a movement would be likely to achieve. The pioneer was forthcoming in the operating manager of the Underground Railways and Omnibus Company. Mr. H. E. Blain had several years before introduced a safety movement for the latter undertaking and for the elementary schools on a scale surpassing in thoroughness and results any work of this nature outside of the United States. A cynic might suggest that Mr. Blain was astutely inducing the public to bear the cost of preventing accidents largely due to omnibuses. That argument cannot be sustained, for the company have proved that their safety work has been a profitable investment. As Mr. Blain remarked at the Municipal Tramways Conference this year, when he was appointed to the L.G.O.C. the amount expended on accident claims was almost phenomenal, but in four years these costs have been reduced by £55,000 a year. It is interesting to learn that in analysing the claims the company found that if the rule of the footpath had been reversed, in all probability three-quarters of the fatal accidents would have been avoided. This reminder of the cause and source of origin of the movement for changing the rule of the footpath will be useful to the local authorities who are considering the question of supporting the propaganda. Omnibuses are not the only vehicles by which persons are run down if they incautiously step from the pavement under the present regulation of keep to the left. Mr. Blain would not have been worthy of his trust, either to the company or indirectly to the public, if he had failed to make an attempt to broaden the basis of the safety movement. Undeniably it is an advantage to the community to have the work carried on by a semi-public body representative of local authorities and of public and private vehicular interests. Its effect must undoubtedly be to lessen the vital and monetary losses, to say nothing of physical suffering, entailed by street accidents. One of the most pleasing aspects of the Safety First Council was the inclusion thereon of representatives of the employees' trade unions, as well as the managers and administrators of traction undertakings. It is pleasing, too, to record that the public carriage departments of the City and Metropolitan Police recognise their duty to the public by sending representatives to the meetings. What explanation, then, can be given for the absence of the London County Council? The cause is due to a mistaken attitude. So notable was the lack of representation of the London County Council at the inaugural meeting that a question was asked upon the point. In reply the meeting was informed that the Clerk had written that while the County Council were in sympathy with the object in view, they felt diffidence as an executive body in sending representatives. Truly a lame excuse. If the same idea had animated the borough and urban councils and the police there would have been no Safety First Council, for they are all executive bodies. In view of the large sum the Council have to pay as compensation for accidents they would be well advised to reconsider their position, which certainly does not receive the support of the Local Government Board, for that body was represented at the inaugural meeting.

Engineering Training. The Institution of Civil Engineers has always taken an active part in the training of engineers, especially of mechanical engineers. What applies to the training of engineers applies equally to many other occupations, especially the question of educating what Sir John Wolf Barry calls "the rank and file." Tramway and railway undertakings employ a large body of these, and the training of their boys after they leave school is a matter almost entirely in the hands of their parents. These same working men have altered enormously of late years, and necessarily so. The absolutely unskilled labourer, who depends entirely on his thews and sinews, and who has only use for a modicum of brains, is becoming more and more scarce in civilised countries. Brute force is of little use in electrically-operated work, and machines are more and more taking the place of purely manual labour. Under

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these circumstances the working man parent finds it difficult to bring up his progeny in his own line of work, where his experience and his connections would be invaluable to his family. He simply cannot afford to keep them while they are learning their trade practically, nor are there many opportunities of introducing and training boys into workshops and on works generally. This difficulty is mainly due to the want of sympathetic co-operation and co-ordination between masters and men. Moreover, even if the lad be welcomed and assisted by the other workmen, manufacturing firms do not like to initiate them in all the specialities of their work unless there is a certainty of their not taking this knowledge elsewhere. Again, there is the thin-veiled antagonism between teachers and practical men; the professors too often look down on the latter as ignoramuses, while the man who does the work is too often irritated by the superiority claimed by college-trained experts. A meeting was held in the theatre of the Institution of Civil Engineers on October 25 at which Sir Maurice Fitzmaurice, who has just vacated the presidential chair, presided. This meeting was the last of a series extending over forty years which have resulted in fairly good provision for the education of the "officers' training corps of engineering." Although the "rank and file" were not mentioned by any of the speakers or in the resolutions passed, those responsible for calling the meeting are so well known to have the welfare of the rising generation at heart that some attempt is sure to be made to find a seat at the round table, at which engineers, manufacturers, and professors are to be invited to confer, for representatives of the workmen, the foremen, shop stewards, and elementary teachers upon whom the actual managing of the rising generation would ultimately devolve. The meeting on October 25, as stated by the chairman, was the most important and representative that had ever taken place in the Institution. The gathering was preceded by a conference attended by nineteen influential men who had decided to call it together, and who drew up the resolution that was passed thereat. The meeting was convened by Mr. A. E. Berriman, chief engineer of the Daimler Company, and Mr. A. P. M. Fleming, of the British Westinghouse Company. It was resolved to appoint a committee to consider some form of central organisation for the improvement and better co-ordination of engineering training. Among those who attended were delegates from 25 technical institutions and societies, from 30 technical bodies, and from 11 Government offices. No Mechanics' Institute was represented, nor anyone from such bodies as the Institute of Locomotive Engineers and the Permanent Way Institution.

MAINTENANCE AND LABOUR FOR TRAMWAYS.

Representative Committee to be Appointed.

On the invitation of the President of the Board of Trade, a meeting of representatives of the Municipal Tramways Association and of the Tramways and Light Railways Association with representatives of the Board of Trade and of the Ministry of Munitions, was held on Nov. 2 at the offices of the Board of Trade, Whitehall Gardens, for the purpose of considering the position of tramway undertakings in the matter of shortage of materials and labour, with special reference to the needs of those undertakings which are engaged in conveying persons occupied on work of national importance. Sir Albert Stanley was accompanied by Mr. Kellaway, Parliamentary Secretary to the Ministry of Munitions. The President of the Board of Trade stated that the position of matters was becoming so acute that the Board of Trade and the Ministry of Munitions thought it necessary to make some arrangement so that instead of having two departments, namely, the Board of Trade and the Ministry of Munitions, dealing with the subject, it could be attended to by one separate body. He invited the co-operation of the two tramway associations, which was gladly promised, and he said that he would be pleased to receive suggestions as to the best methods of carrying out the scheme. He announced that Mr. James Devonshire had been appointed controller of the scheme.

The Board of Trade have obtained full particulars of the work that is being done by the tramways, including the number of munition works which are served. These have greatly increased in number during the past year.

Official Statement.

On November 10, the Board issued the following statement:—In view of the difficulty in meeting the demands for materials and labour required for the maintenance and renewal of the permanent way and rolling stock of tramway undertakings, the Board of Trade are appointing a committee to consider the needs of these undertakings so that the necessary steps may be taken to supply, as far as possible, such needs, even though it may be at some temporary sacrifice to less essential undertakings. The Municipal Tramways Association and the Tramways and Light Railways Association are being invited to nominate members to the committee, and the Board have asked the London County Council to allow Mr. A. L. C. Fell, the manager of their tramways, to serve on it. Mr. James Devonshire has been invited to be chairman of the committee. It is not intended that the control of tramway undertakings should be interfered with by the committee.

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CHARGES FOR POWER FOR TRAMWAYS.

The Effect of War Conditions.

Most of the municipal tramways in this country buy electrical energy from the electricity departments of their Corporations. In the past there have naturally been disputes between those departments, the electricity committee wanting a good price so as to be able to present favourable accounts, especially where the lighting part of the business was run at a loss. The tramway department, on the other hand, wished to have the energy at as low a figure as possible, so as to aid in keeping down the working expenses of the tramways. Compromises or agreements were arrived at, and for some time before the war something like definite bases of charge had been reached, the price per unit varying with the cost of coal in the locality and with other local circumstances. After the war had been in progress for some time, the electricity undertakings began to feel the effect of the gradual increase in the price of coal and other supplies, and also of the rise in wages. Sooner or later, therefore, the demand had to come for a higher price for electricity from all consumers, and the tramways were not made an exception to the rule. It is true that for reasons which are probably peculiar to the localities, there are still a number of places in the country where no increased charge has been made for electricity for tramways, as compared with the pre-war days. In the great majority of cases, however, there have been increases.

The managers of those municipal tramway undertakings which do not own the power stations have kindly given the prices per Board of Trade unit charged to the tramways by the electricity departments before the war and the prices now, and the particulars are set out in the accompanying table. As will be seen, 47 undertakings report increases. These increases run from about 10 per cent. up to as much as 40 per cent. In any examination of the table, the local conditions must, of course, be taken into account, and among these, beside the price of coal, is the load factor on the power station apart from the tramway load. It may be hoped that if the Coal Controller succeeds in preventing any further substantial increase in the price of coal, it will not be necessary to raise the charges for electricity much more, except so far as may be necessary to meet further increases of wages.

The tramway managers in fourteen towns inform us that there has been no increase in the charge for power, but in some of these cases an early increase is anticipated.

Town.	Pre-War Rate.	Present Rate.
Accrington	1·23d.	2·25d.
Ashton-under-Lyne	1·25d.	1·6d.
Ayr	1½d. first 200,000 units and 1d. above	1·87d. first 200,000 units and 1·25d above
Birmingham ...	1·125d. (on a minimum of 18 million units per annum)	1·125d. plus ·015d. for every 6d. increase in price of coal per ton above 9s.
Blackburn	1·3d.	1·495d.
Blackpool	1·6d.	1·76d.
Brighton	1·2d.	1·4d.
Burnley	1·2d.	1·25d.
Burton-on-Trent ...	2d. first 100,000 units and 1½d. above	2·3d. first 100,000 units and 1·437d. above
Bury	1d.	1·15d.
Chester	1·33d.	1·506d.
Colchester	1½d.	1⅝d.
Croydon	2d. first 1,000,000 units, 1½d. second 1,000,000, and 1d. above	2d. first 1,000,000 1¾d. second units, 1,000,000, and 1½d. above
Darwen	1·28d.	1·4625d.
Derby	1·45d.	1·595d.
Doncaster	1·25d.	1·5625d.
Dundee	1d.	1·1687d.
East Ham	1·0625d.	1·1687d.
Gloucester	1d.	1·333d.
Great Yarmouth ...	1·5d.	1·65d.
Halifax	1⅛d.	1¼d.
Ilford	1 1/10d.	1⅛d.
Ipswich	1½d.	1·875d.
Kirkcaldy	1d.	1⅛d.
Lancaster	1·7d.	1·9d.
Leith	1·001d.	1·5673d.
Leyton	1½d. first 1,500,000 units, 1d. next 300,000, and ¾d. above	1·3125d. first 1,500,000 units, 1·05d. next 300,000, and ·7875d. above
Liverpool	1·13d.	1·204d.
Maidstone	1·125d.	1·5d.
Manchester ...	1·026d.	1·1483d.
Newport ...	1·35d. first 1,000,000 units, and 1d. above	1·755d. first 1,000,000 units, and 1·3d. above
Nottingham ...	1·25d.	1·406d.
Plymouth	1½d. first 750,000 units, and 1⅛d. above	1·56d.
Rawtenstall ...	1¼d.	1·375d.
Rochdale	1d.	1·25d.
Southampton ...	1⅜d.	1·787d.
Southend	1·75d.	2d.
Stockport	·513d.	·536d.
Swindon	1·25d.	1·375d.
Walsall	1·68d.	2·352d.
Walthamstow ...	1·375d.	1·394d.
Warrington ...	1⅛d.	1·725d.
West Ham	·75d.	·91d.
West Hartlepool ...	·75d.	1·15d.
Wigan	1·188d.	1·25d.
Wolverhampton ...	1d.	1·3d.
York	1·25d.	1·375d.

Electric Power Supply Committee.—In reply to a question asked the President of the Board of Trade in the House of Commons on November 7, Mr. Wardle said that the Departmental Committee on Electric Power Supply had not yet presented a report, and he could not say at present when it would be able to do so. In view of the great importance of the subject there would, however, be no avoidable delay.

Irish Light Railways and Tramways Act.—In the House of Commons, the Chief Secretary for Ireland informed Mr. Byrne that schemes under the Tramways (Ireland) Act required the approval of the County Councils concerned, which must be given at two quarterly meetings. Under Section 43 of the Tramways (Ireland) Act of 1860 mansion houses, demesnes, etc., could not be acquired without consent of owners, but by Section 5 of the Light Railways (Ireland) Act, 1889, an order of the Lord Lieutenant might provide that Section 43 of the Act of 1860 shall not apply. The railway under consideration for the development of collieries was authorised by the Defence of the Realm Regulations.

Burton-on-Trent Corporation Tramways.—The Tramways Committee estimate that there will be a deficiency of £2,660 for the current year if there are no further increases in the cost of materials or wages. Transfer tickets have been abolished, but the proposed increase in fares has been suspended for six months.

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MUNICIPAL TRAMWAYS AND WAR.

ALLOWANCES, BONUSES, NUMBERS OF MEN WHO HAVE JOINED THE COLOURS, Etc.

The Municipal Tramways Association have issued an elaborate series of tables containing the results of replies to queries addressed to the municipal tramway authorities as to allowances to dependants, war bonuses, enlistments, employment of women, auxiliary drivers, etc. For convenience of reproduction we have taken the two columns containing the greatest amount of reading matter out of the tables and printed their contents in paragraph form. The other columns stand in tabular form as in the original. The smaller table is a summary of the details in the longer tables. They constitute a fine record both for employers and employed. The tables were compiled from information supplied in August, and some important changes have since taken place.

ALLOWANCES TO DEPENDANTS OF EMPLOYEES WHO HAVE JOINED THE COLOURS.

(*a*) *In the case of married men.*
(*b*) *In the case of single men.*

ABERDARE.

(*a*) 10s. per week for wife, and 1s. per week for each child.
(*b*) Each case considered, and if deserving, 10s. per week to dependant father or mother.

ABERDEEN.

(*a*) Difference in pay made up by the Corporation.
(*b*) Difference in pay made up by the Corporation.

ACCRINGTON.

(*a*) Up to May, 1915, half wages granted to dependants. Since that date each case dealt with on its merits.
(*b*) As above.

ASHTON-UNDER-LYNE.

Half wages to all men, married or single, but when such sum, together with Government allowance, exceeds the average weekly earnings, the Corporation allowance is correspondingly reduced. No account has been taken of the extra allowance for children granted short time back, or extra pay earned by promotion.

AYR.

(*a*) The Corporation make up the difference between the Government pay and the wage received prior to joining the colours.
(*b*) Difference made up between army pay and amount paid to dependant.

BARKING.

Full pay, including war bonus, less 7s. per week and separation or dependant's allowance. Commissioned ranks, full pay, less army pay

BELFAST.

(*a*) Half pay. (*b*) Half pay.

BEXLEY.

(*a*) Half pay. (*b*) Where dependants, half pay.

BIRKENHEAD.

(*a*) Men who joined up to November 15, 1915, full wages, less Government allowance. Since that date, four-fifths wages, less Government allowance.
(*b*) Single men, one-third wages, less Government allowance. Exceptional cases receive special consideration.

BIRMINGHAM.

In each case the amount of their army pay, together with dependants' or separation allowance, has been made up to the amount of wages received from the tramways department.

BLACKBURN.

(*a*) Average weekly earnings made up, less army pay and separation allowance.
(*b*) Each case considered individually and allowances made according to loss of wages sustained by dependants, chiefly amounting to 6s. weekly.

BLACKPOOL.

(*a*) 12s. 6d. for wife, 2s. 6d. for each child under 16 years.
(*b*) Half wages, but in neither case, (*a* or *b*), total pay from all sources to exceed that whilst in municipal service.

BOLTON.

(*a*) Full wages, less army allowances.

BOURNEMOUTH.

(*a*) Difference made up as between army pay and civilian pay.
(*b*) Half pay.

BRADFORD.

(*a*) Full wages, less Government separation allowance and cost of living, estimated at 7s. per week.
(*b*) 10s. per week.

BRIGHTON.

(*a*) Made up to full pay, plus 1s. 6d. uniform allowance, less Government separation allowance.
(*b*) Half pay, plus 9d. uniform allowance. In each case the man's army pay is taken into account, but by the sanction of the L.G.B. the total amount may exceed his normal tramway pay by 25 per cent.

BURNLEY.

Normal wages made up.

BURTON-ON-TRENT.

(*a*) Full wages, less separation allowance and army pay (after deducting allotment).
(*b*) A sum not exceeding 10s., but no more than sufficient to bring army pay up to full wages.
5s. bonus just granted is not added to allowances to men on service, as was done with former bonuses.

BURY.

The difference between the army pay and their wages is made up by the Corporation.

CARDIFF.

Difference between normal weekly wage and army pay, without reckoning recent War Office additional grant to dependants.

CHESTER.

(*a*) Full pay, less all army pay and allowances.
(*b*) Cases individually considered, if they have any dependants.

CHESTERFIELD.

(*a*) Wages made up.
(*b*) Half pay.

COLCHESTER.

(*a*) Difference between separation allowance and wages made up.
(*b*) The dependants of single men are given the same allowances as the wives of the married men.

COLNE.

(*a*) 5s. per week, and an extra 2s. per week for each child.
(*b*) None.

COVENTRY.

(*a*) 10s. per week to wife and 1s. per week extra for each child.
(*b*) Special allowance is made to unmarried employees who have dependants (to whom they have been accustomed to make weekly allowance), averaging 5s. to 6s. per week.
Members of the staff are paid full wages, less the army pay and cost of living, estimated at 7s. per week.

CROYDON.

(*a*) Half average wages.
(*b*) Third of average wages.

DARLINGTON.

(*a*) The difference between their pay and what they receive from the army, less an allowance for the man's food.
(*b*) An amount equal to the amount the man allots to his dependants out of his army pay, with a maximum of 5s. per week.

DARWEN.

(*a*) Government allowance made up to three-quarters their average wage.
(*b*) This is decided by a special committee, the circumstances of his family being taken into consideration.

DERBY.

(*a*) If total pay and separation allowance is less than wages the balance is made up.
(*b*) If total pay and separation allowance is less than wages the balance is made up.

DONCASTER.

(*a*) 50 per cent. ordinary wages, but this sum plus the army allowance has not to exceed the ordinary wages by more than 25 per cent.
(*b*) 33⅓ per cent.

DOVER.

(*a*) Average full wage, less total military income.
(*b*) Three-quarters of average full wages, less total military income.

DUNDEE.

A sum is added weekly to army pay and allowances to bring income up to wages paid in civil employment.

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EAST HAM.

(*a*) Full pay, less amount received from H.M. Forces for separation allowance.

(*b*) Full pay, less amount of pay received from H.M. Forces.

(Any man who obtains promotion to be allowed continuance of the same pay.)

ERITH.

(*a*) The difference between the army allowance and the man's usual earnings.

(*b*) Half the usual weekly earnings.

GLASGOW.

(*a*) Two-thirds wages, less 9s. per week.

(*b*) One-third wages.

GLOUCESTER.

Normal earnings made up by supplementing army or naval pay and allowances.

GREAT YARMOUTH.

Such sums, as with the pay received from the Government, make up their full wages. This applies to married and single men.

HALIFAX.

(*a*) Army pay and separation allowance deducted from normal week's wages.

(*b*) Army pay and dependency allowance deducted from normal week's wages.

HUDDERSFIELD.

(*a*) Full wages, less army or navy allowances and allotment.

(*b*) Full wages, less army pay and allowances.

HULL.

Military allowances, etc., have been made up by the Corporation to the amount which the men would have received had they remained in this service.

Married men the same as single men.

ILFORD.

(*a*) Amount of wages made up—plus a war bonus of 7s. per week.

(*b*) Amount of wages made up.

IPSWICH.

Up to January 23 last 5s. per week for all men up to 25s. per week wages, plus half of any wages beyond that figure.

(*a*) From January 23 last, such an amount, as with army pay and allowances together with an estimated figure of 12s. per week for food, etc., should bring up the total income to not more than civil pay.

(*b*) 2s. 6d. per week, subject since January 23 to the requirement as to the amount of civil pay.

KILMARNOCK.

(*a*) Separation allowance made up to wages at date of enlistment.

(*b*) 7s. 6d. per week.

KIRKCALDY.

(*a*) Make up military pay plus separation allowance to full civil pay.

(*b*) Only with dependants—a sum not more than Government payment to dependants and total received from army pay, separation allowance and tramways department, not to exceed former civil pay.

LANCASTER.

(*a*) Three-eighths of full pay.

(*b*) Three-eighths of full pay.

LEEDS.

(*a*) 5s. per week to wife and 2s. for each child under 15.

(*b*) 5s. per week. Officials half pay.

LEICESTER.

(*a*) Difference between wages paid August, 1914, and amount received from Government.

(*b*) Difference between two-thirds of wages paid in August, 1914, and amount received from Government.

LEITH.

(*a*) Allowance equal in amount to their respective wages, but subject to deduction of any separation allowance.

(*b*) Allowance of 6s. 8d. per week, equivalent to allowance made by Government.

LEYTON.

Full civil pay to all pre-war employees (married or single), less Government emoluments.

LINCOLN.

Wages made up to average normal week, after army pay taken into consideration, plus 6s. war bonus for married men only.

LIVERPOOL.

Difference between army pay and ordinary wages.

LONDON COUNTY COUNCIL.

Full pay, less army pay and separation allowance

MANCHESTER.

Full pay made up, less army pay, i.e., 7s. per week and separation allowance, but in no case less than half wages paid.

NELSON.

(*a*) Full wages made up, based on 56 hours.

(*b*) No allowance whatever.

NEWCASTLE-ON-TYNE.

(*a*) Ordinary wages, less Government separation allowance, plus 2s. 6d. war bonus.

(*b*) Ordinary wages, less army pay, plus 1s. 6d. war bonus.

NEWPORT.

(*a*) Allowances made so that army or navy pay produces equivalent to amount earned by man when working for department.

(*b*) Sum equal to amount received in army or navy allowed, provided such amount does not exceed present wages. If man has dependants, treated as a married man.

NORTHAMPTON.

The army pay to employees is made up to the wage he was in receipt of when he joined the army. All automatic increases in wages carry on the same as if the man were at work. The war bonus is also given to men on military service, married and single men being treated alike.

NOTTINGHAM.

(*a*) An allowance ranging from 5s. 8d. to 6s. 8d. per week, according to the number of children, and payment of contributions to Friendly Societies.

(*b*) Payment of weekly contributions to Friendly Societies, and in special cases an allowance of 3s. 6d. per week to parents.

OLDHAM.

(*a*) A maximum of 16s. per week to those who were employed before the war.

(*b*) 10s. per week.

PONTYPRIDD.

(*a*) In the case of old employees, the difference between their army pay, allowances, etc., and what they earned whilst in our employ.

(*b*) Ditto.

PORTSMOUTH.

(*a*) Difference between man's tramway pay and his army pay and allowance.

(*b*) Single men joining the forces with the permission of the committee be paid their salaries or wages as at the date of their joining, subject to a deduction being made therefrom of the sum of 15s. per week in each case of lodging, food and clothing, and their respective service pay including one half the Government allowance, if any, for dependants.

PRESTON.

(*a*) The wages of married officers and servants are paid subject to deduction equal to the amount of the Government pay and allowances.

(*b*) Weekly allowance of 5s. made in respect of all unmarried officers and servants.

RAWTENSTALL.

(*a*) Such a sum, as with the pay and allowances, the employee and dependants receive from the Government and elsewhere will amount to the average weekly wage, but in no case shall the total amount received from all sources exceed 32s. 6d. per week. In case of the decease during the present war, the said weekly payment by the Corporation shall cease at the expiration of six calendar months from the date of such decease.

(*b*) One half the average weekly wage, but the maximum weekly payment by the Corporation shall not in respect of any one case exceed 16s. 3d. Employees who are unmarried and without dependants, the said weekly payments by the Corporation shall be set aside for and until the return of such employees, but should any not return, the weekly payments in respect of those shall belong to the Corporation.

READING.

(*a*) The difference between their army pay and allowance and the wages paid prior to enlistment.

(*b*) One-third civil pay, or, when this amount together with army pay and allowances exceeds their civil pay, the difference between army pay and allowance and their civil earnings.

ROCHDALE.

Half wages.

(*a*) Married men receive the difference between army pay and allowances and their previous weekly wages, plus 25 per cent.

(*b*) Half pay.

ROTHERHAM.

(*a*) Ordinary rate of pay, less army pay and separation allowance. Minimum 10s. per week, plus 1s. each child.

(*b*) Ordinary rate of pay, less army pay, 12s. 6d. keep. Minimum, 7s. per week.

SALFORD.

Wages and war bonus, less army pay and separation allowances.

SHEFFIELD.

(*a*) Minimum allowance equal to original scale of Government separation allowance, viz., 1s. 1d. per day for wife and 2d. per day each child. Each case is considered by a sub-committee of the Corporation, and such sum is granted as after taking off a sum (which in no case exceeds 7s.) for the man's board, clothing, etc., when at home, makes the income equal to the normal weekly wages of the man before joining the forces.

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(*b*) No allowance is granted by the Corporation until the soldier makes an allotment to his dependants. Each case is considered on its merits with a view to any deficiency occasioned by the workman having left home being made up either by Government grant or Corporation allowance.

Dependants of employees who are claimed by the military authorities under the Military Service Acts receive no allowance.

SOUTHAMPTON.

(*a*) Half pay in first instance, but men who have joined up since latter part of 1915 received difference between normal pay and Government allowance.

(*b*) Half pay.

SOUTHEND-ON-SEA.

(*a*) Full pay, less army pay and separation allowances.

(*b*) With dependants, three-quarter pay as above; without dependants half pay as above.

SOUTHPORT.

The Corporation make up to full amount of wages all moneys received from the Government—2s. war bonus. This applies to both married and single men.

SOUTH SHIELDS.

(*a*) Difference between military pay (inclusive of all allowances) and weekly wage at date of joining.

(*b*) Ditto.

STALYBRIDGE, HYDE, MOSSLEY AND DUKINFIELD.

(*a*) Average wages made up after taking into account separation allowance and army pay.

(*b*) Not to exceed 5s.

SUNDERLAND.

(*a*) Wages made up.

(*b*) According to circumstances in each case.

SWINDON.

(*a*) Full wages, less army pay and allowances.

(*b*) Ditto.

WALLASEY.

(*a*) Men enlisted from August 3 to November 17, 1914, full pay, less army separation allowance and army pay above the rank of private; since November 17, 1914, one-third pay, providing total income does not exceed wages at time of enlistment.

(*b*) Men enlisted from August 3 to November 17, 1914, full pay, less army pay; since Novermber 17, 1914, one-third pay, providing total income does not exceed wages at time of enlistment.

WALSALL.

(*a*) Half wages to employees who joined prior to November, 1915, provided that such payment, together with Government pay and allowances, does not exceed by more than 10 per cent. the man's civil remuneration, including 3s. war bonus. Employees who have joined since November, 1915, receive an allowance equal to the difference between Government pay and allowances and the wages (excluding bonus) prior to enlistment.

(*b*) Discretionary.

WARRINGTON.

(*a*) Military pay made up to men's wages at present rates, plus war bonus.

(*b*) 10s. per week.

WALTHAMSTOW.

(*a*) Married men are paid a sum which, with their army allowances brings the income of the home to 10s. less than they were earning before enlisting.

(*b*) Each case relating to single men is considered on its own merits.

WEST HAM.

(*a*) Pre-war wages, less army pay and separation allowance.

(*b*) Pre-war wages, less army pay.

WEST HARTLEPOOL.

(*a*) Difference between army and civilian pay.

(*b*) Same as to married men, less 5s. subsistence allowance.

WIGAN.

(*a*) Corporation make up separation allowance to within 5s. of pre-war wage.

(*b*) 5s. per week.

WOLVERHAMPTON.

(*a*) Wife 1s. 1d. per day, plus 2d. per child. Nothing to motor transport men.

(*b*) 7s. 6d. is put aside each week until men return.

YORK.

All men called up or joining the colours up to May 1, 1915, had their military pay and allowance made up to an ordinary average weekly wage, and on going to the front a grant equal to the full week's wage is paid each week. Men joining after May 1, 1915, receive a grant, which, together with their army pay and allowance, brings the total up to an average weekly wage. Full pay to men at the front had to be discontinued as from June 30, 1916, to comply with the requirements of the L.G.B. Special Act.

WAR BONUS TO EMPLOYEES AND APPROXIMATE COST PER ANNUM TO THE DEPARTMENT.

ABERDARE.

Wages and war bonus, 12s. per week over pre-war wages. Youths under 18, one-half increase.

Cost to department per annum, £1,588.

ABERDEEN.

Male employees, 9s. up to 30s.; 8s. up to 40s.; 7s. 6d. up to 60s.

ACCRINGTON.

Males, 9s. per week, less ¼d. per hour increase = 7s. 10d. bonus. Females, 6s. per week, less ¼d. per hour increase = 4s. 10d. bonus.

£1,800 bonus. £300 increase.

ASHTON-UNDER-LYNE.

Males, 9s. per week over pre-war rates. Females, 6s. per week over pre-war rates.

£1,700.

AYR.

Male employees, 7s. per week. Female employees, 5s. per week. Under 21 years of age, 3s. per week.

Approximate cost per annum, £1,020.

BARKING.

Men over 21, 4s. increase; 10s. war bonus. Men under 21, 2s. increase; 5s. war bonus.

War bonus only, £687 per annum.

BELFAST.

Motormen, conductors and miscellaneous employees, 9s. per week; tradesmen, from 9s. to 14s. 6d. per week.

Approximate annual cost, £20,500.

BEXLEY U.D.C.

5s. to married men; 2s. 6d. to women, single men and youths.

£1,120. Wages increases in addition approximate amount to £1,800.

BIRKENHEAD.

Staff, 10 per cent.; males, 9s. per week; females, 6s. 6d. per week.

£4,000 per annum.

BIRMINGHAM.

9s. 6d. per week in war bonuses has been granted to employees at an annual cost of approximately £81,510.

In addition, a permanent increase of 2s. per week was granted shortly after the outbreak of war at an annual cost to the department of, approximately, £17,160.

BLACKBURN.

Conductors and motormen, 5s. 7½d. weekly.

£2,193 15s.

BLACKPOOL.

7s. per week to male employees over 21 earning less than 30s. per week; between 30s. and 31s. 6d. wages made up to 37s.; over 31s. 6d. per week, 5s. 6d. Male employees under 21, 4s. 6d. per week. Females, 2s. per week war bonus. (These latter employees have also received ¼d. per hour increase.)

BOLTON.

Males over 18, 9s. per week; females over 18, 6s. por week. Males and females under 18, 4s. 6d. per week; all skilled workmen, 15s. per week.

Approximately, £9,000.

BOURNEMOUTH.

Four bonuses granted to weekly-paid staff, bringing total up to 9s. per week each, with 3s. for youths under 18.

BRADFORD.

Females, 6s. per week; males, 12s. per week.

£42,000 per annum.

BRIGHTON.

Married men, 1d. per hour worked, plus 3s. per full week, plus 9d. per week for each child under 16 not earning. Single men, ½d. per hour worked, plus 3s. per full week. Women conductors, ½d. per hour all round, plus 3s. per week to those over 21. Married, plus 9d. per week per child as above. Weekly salaried employees, 6s. per week, plus 1s. 6d. per child.

BURNLEY.

2s. 6d., and 1s. 3d. under 18.

£1,700. Note.—A heavy permanent increase granted from October 25th, 1916.

BURTON-ON-TRENT.

Men, 11s. to 12s. per week, according to rate of pay; women, 7s. 6d. to 7s. 11d. per week, according to rate of pay; youths, 5s. to 6s. per week, according to rate of pay. Women's bonus is based on ratio of hours worked per week (45) to men's hours (60).

Annual cost, £1,560.

BURY.

Male conductors, male cleaners, shed labourers, 9s. per week. Overhaulers, motormen, 7s. 9d. per week. Female conductors and cleaners, 6s. per week.

£4,316.

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CARDIFF.

Traffic employees, ½d. permanent wages advance, ½d. war wages, and ½d. war bonus. Committee have now offered an inclusive war wage of 1½d. per hour to married and 1½d. per hour to single men; ½d. per hour to females and ½d. per hour to boys. Other employees, including R.P. station and sheds, 1d. per hour permanent advance and 4s. 6d. war bonus.

CHESTER.

Cashier, 3s. 8d.; clerk, 2s. 4d.; drivers, 4s.; cleaners, 2s.; conductors, 1s.; male inspector, 4s. per week.

£200 per annum.

CHESTERFIELD.

War bonus withdrawn.

COLCHESTER.

Married men, 7s. 6d.; single men, 6s.; women, 2s. 6d. per week.

Approximate, £1,000 per annum.

COLNE.

5s. permanent increase in place of the 6s. 6d. awarded by the Ministry of Production and 2s. 6d. war bonus as the last award by the Ministry of Production.

COVENTRY.

Increases in wages granted since commencement of war as under: March 21, 1915, ½d. and ½d. per hour; October 2, 1915, ½d. per hour; July 23, 1916, ½d. per hour; March 4, 1917, ½d. per hour; April 1, 1917, ½d. per hour.

Approximate cost per annum, £6,500.

CROYDON.

Motormen, 5s. per week; male conductors, 5s. per week; women conductors, 2s. 6d. per week; other grades, 7s. per week

DARLINGTON.

Men, 10s. per week; women, 5s. per week.

£1,339.

DARWEN.

No war bonus granted.

DERBY.

Males over 21, 7s. per week advance on pre-war rate and 5s. war bonus. Females, 2s. 3d. war bonus.

Approximate cost, £3,000 per annum.

Previous to May 2, 1917, war bonuses of 3s., 2s., and 1s. 6d. per week to men earning less than 30s., 35s., and 40s., plus ½d. per hour.

DONCASTER.

Increases of from 8s. 6d. to 10s. 6d. per head, as war wages.

Cost per annum, £1,250.

DOVER.

4s. per week to married men and women, and 6d. per child in excess of two under 14 years, and 2s. to all single employees over 18 years.

Approximate cost per annum, £405.

DUNDEE.

1s. per week to those earning between 20s. and 30s. per week.

Total per annum, £352.

EAST HAM.

Tramway employees, 9s. per week over pre-war rates to all men; 1s. 6d. to boys and youths; females, 2s. 6d.

ERITH.

15 per cent. to males, 7½ per cent. to females.

£800 per annum approximate.

GLASGOW.

Semi-skilled and unskilled men, 6s. per week; females, 1s., plus 2s. after six months' service.

GLOUCESTER.

Married or with *bona-fide* dependants, 8s. per week; single males, 4s.; females, 1s. 6d.

Approximate cost per annum, to present employees, £1,532; to dependants, £321; total, £1,853.

GREAT YARMOUTH.

2s. to 4s. per week, according to length of service.

HALIFAX.

4s. per week.

£3,525.

HUDDERSFIELD.

Males, 10s. per week; females, 4s. 6d. Clerical staff: males over 21, 8s.; males under 21, 4s.; females, 4s.

Cost, £9,800.

HULL.

6s. 6d. per week.

£10,000 per year.

ILFORD.

7s. per week, plus 6d. for each child under 14.

IPSWICH.

3s. per week up to 40s. per week wages, 7½ per cent. above and up to £150 per annum, and 5 per cent. on £150 up to £200 per annum.

KILMARNOCK.

7s. to males; 3s. 6d. to females.

£470 per annum.

KIRKCALDY.

2s. March, 1915; 2s. March, 1916; 2s. November, 1916; 2s. April, 1917.

£700 per annum.

LANCASTER.

3s. war bonus to men, 1s. 6d. to boys.

LEEDS.

7s. per week, considered as war wages.

Approximate cost for the year ended March 31, 1917, £10,929.

LEICESTER.

12s. bonus on pre-war rate of pay. Female conductors, 10s.

£25,000 per annum.

LEITH.

£625.

LEYTON.

12s. per week to skilled mechanics over pre-war rate; 1s. 6d. per day inspectors and regulators; 1s. 6d. per day motormen and male conductors; 11d. per day female conductors; 4s. per week ticket department and female clerical staff (temporary); 1s. 6d. per day shed labourers; 11d. per day youths under 21.

£7,350 per annum (approximate).

LINCOLN.

Boys under 16, 5s. 6d. per week; over 16 and under 21, 6s. 6d. per week; able-bodied men of 21 and under 65, 11s. Females under 21, 6s. 6d. per week; 21 and over, 9s.

Approximate annual cost, £793.

LIVERPOOL.

12s. per week males; 7s. 6d. females.

About £56,000 per annum.

LONDON COUNTY COUNCIL.

Amount of war bonus or war wages varies from 3s. 10d. to 15s. per week, according to grade of employee and rate of pay received.

Approximate cost per annum, £225,000.

MANCHESTER.

9s. to all male employees of 18 and over; 4s. 6d. to all males under 18; 6s. per week to women guards; 6s. to women cleaners; 3s. 3d. to trolley girls. Administrative staff—Males receiving from 26s. per week to £150 per annum, bonus 9s.; bonus and salary not to exceed £150. From £150 to £300 per annum, 6s. 6d.; bonus and salary not to exceed £300. Females (all ages), bonus 4s. 6d.

Approximate cost per annum, £73,268.

NELSON, LANCASHIRE.

No war bonus.

NEWCASTLE-ON-TYNE.

Householders and those with dependants, 5s.; single men, 4s.; single men, 18 to 21, 1s. 6d.; single men under 18, 1s. An advance in wages of 5s. has recently been granted to motormen and conductors.

Cost of bonuses per annum, £11,960.

NEWPORT.

Various advances have been made in all departments, as well as 5s. per week war bonus to males over 21.

NORTHAMPTON.

The war bonus at present in force is 4s. per week, plus 1d. per hour for all hours worked for adults, those under 21, 2s. per week, plus 1d. per hour.

NOTTINGHAM.

Ranging from 7s. to 9s. per week.

Approximate cost per annum, £8,721 9s. 8d.

OLDHAM.

Males of 18 and over, 9s. over pre-war rates; males under 18, 4s. 6d. over pre-war rates; females of 18 and over, 6s. over pre-war rates; females under 18, 3s. 3d. over pre-war rates.

Approximate cost, £9,891.

PONTYPRIDD.

Men under 30s., 13s.; men under 40s., 12s.; over 40s., 11s.; boys, 8s. 6d.; youths, 9s. 6d.

£2,600.

PORTSMOUTH.

Up to and including 30s., 3s. a week; above 30s. and up to and including 40s., 2s.; above 40s. and up to and including 45s., 1s. a week. Each married employee receives 6d. a week extra for every child (above one child) under the age of 14. Single employees receive one-half of the above war bonus.

Approximate cost per annum, £2,392.

PRESTON.

9s. per week to all employees with the exception of the officials. Bonus granted to officials as follows:—3s. where wages do not exceed 20s. per week; 6s. where they exceed 20s. but do not exceed 30s.; 4s. 6d. where they exceed 30s. but do not exceed 35s.; 3s. where they exceed 35s. but do not exceed 60s. per week.

RAWTENSTALL.

Permanent advance of 1d. per hour granted to drivers and conductors and 1½d. to cleaners in lieu of war bonus.

Annual cost, about £1,000.

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READING.

War allowances and bonuses. Trade Union awards for the district:—Fitters, 16s.; carpenters, 9s.; painters, 7s.; blacksmiths, 12s.; labourers, 11s.; inspectors, 5s. permanent increase; motormen and conductors, maximum 8s.

ROCHDALE.

9s. per week to males over 18; 6s. to females over 18.

ROTHERHAM.

11s. per week motormen and conductors (male); 9s. conductors over 21; 5s. a week conductors under 21.

SALFORD.

Tradesmen's war wages, 15s. per week, included in rate of pay. Employees' war bonus (other than tradesmen):—Males, 18 years and over, 9s. per week; under 18, 4s. 6d. Females, 18 and over, 6s.; under 18, 3s. 3d.

£33,500.

SHEFFIELD.

15s. per week to engineers, handymen, overhaul fitters, wiremen, and coachmakers; 12s. to drivers and shed labourers; 12s. to conductors (men); 7s. to conductors (women); 13s. to car cleaners (men); 7s. to car cleaners (women).

£51,337.

SOUTHAMPTON.

9s. a week to men receiving 27s.; 8s. 6d. to men receiving 27s. 6d.; 8s. to men receiving 30s. to 40s.; 6s. to men receiving 40s. to 50s.; 4s. to men receiving 50s. to 60s. Female conductors and car cleaners, 4s.

£5,099 per annum.

SOUTHEND-ON-SEA.

5s. for married men; 3s. for single men.

£1,053 10s. per annum.

SOUTHPORT.

All men over 18 have received 8s. on pre-war wages, 4s. 5d. of which is war bonus and 3s. 7d. permanent increase in rate of pay. All women, 3s. 6d. per week war bonus.

Approximate cost, £850 per annum.

SOUTH SHIELDS.

11s. per week to married men; 6s. 6d. per week to single men; 2s. per week to boys.

£2,000 annually.

STALYBRIDGE, HYDE, MOSSLEY, AND DUKINFIELD.

Males over 18, 9s. per week; under 18, 4s. 6d. Females over 18, 6s.; under 18, 3s. 3d.

£5,000.

SUNDERLAND.

11s. men; 6s. women; 3s. 6d. youths (under 18).

£6,344.

SWINDON.

4s. per week to married men up to 45s.; 3s. to married men up to 30s. All the employees have received increases in wages of varied amounts, and there is an application under consideration for the war bonus to be increased to 10s. per week.

WALLASEY.

Males over 18, 6s. 6d. per week; males under 18, 3s. 3d. Females, 2s. 6d.

£2,660 per annum.

WALSALL.

Present war wages:—Males over 21, 9s. per standard week; 18 to 21, 7s. 6d. per standard week; under 18, 4s. per standard week; females over 21, 7s. per standard week; 18 to 21, 5s. per standard week.

Approximate cost per annum, £4,100.

WARRINGTON.

9s. per week to men over 18; 4s. 6d. to men under 18; 6s. per week to women.

£2,219.

WALTHAMSTOW.

8s. 6d. per week to employees supporting a home and 5s. per week to remainder.

£1,200.

WEST HAM.

Skilled and semi-skilled, in accordance with engineering award. All other male employees increase on pre-war rate aggregating 9s. per week of six days. Females over 21, 4s. 6d per week; under 21, 3s. 6d.

Approximate cost, £17,500.

WEST HARTLEPOOL.

9s. per week, plus 6d. for each child under 14.

£1,600 per annum.

WIGAN.

Officials, 15 to 30 per cent.; motormen, conductors (male), and labourers, 9s.; female employees, 6s.; youths and girls under 18, 4s. 6d.; skilled men, fitters, etc., 15s.; coach painters and body-makers, 12s.

Approximate cost per annum, £4,979.

WOLVERHAMPTON.

2s. war bonus granted March 1, 1915; 3s. May 1, 1916; 5s. granted April 1, 1917.

Approximate cost per annum, £5,200.

YORK.

	Householders.	Single.	Under 18.
30s. and under	9s. ...	5s. ...	2s. 6d.
31s. to 43s	8s. ...	4s.	
44s.	7s. ...	3s.	
45s. to 57s.	6s. ...	2s.	
58s.	5s. ...	2s.	
59s.	4s. ...	2s.	
60s.	3s. ...	2s.	
61s.	3s. ...	1s.	
62s. to 96s 8d.	3s. ...		
97s. 8d.	2s		
98s. 8d.	1s.		
99s. 8d. and over	—		

SUMMARY.

	July, 1916	July, 1917
Number of municipal authorities replying to queries	88	84
Number of towns certified under Munitions of War (Amendment) Act	44	57
Number of employees at normal times ...	55,208	55,208
Number of men who have joined His Majesty's Forces	20,905	29,268
Percentage to total	38	53
*Number of men who have left municipal tramways undertakings to join munition factories	1,893	1,776
Percentage to total	3½	3·2
Amount paid to dependants of employees serving with His Majesty's Forces ...	£854,649	£1,437,603
Average allowance per man per week ...	10s. 7½d.	11s. 4½d.
Amount collected on cars for various national and other objects	£43,800	£84,509
Amount contributed by municipal tramway employees to various relief funds ...	£36,070	£38,170
Number of municipal systems employing women conductors	75	76
Number of women conductors	8,433	11,757
Number of municipal systems employing women drivers	7	18
Number of women drivers	176	611
Number of municipal systems employing auxiliary drivers	19	26
Number of auxiliary drivers (male) ...	320	564

* The figures under this heading are only approximate, as it is not known what particular section or unit the men have joined, and therefore in some cases these have been included in enlistments.

EDINBURGH TO QUEENSFERRY TRAMWAY.

The Edinburgh Town Council on October 30 decided to apply for Parliamentary powers to construct an electric tramway from Edinburgh to Queensferry—a distance of eight miles. The Council had before it as a basis reports by Mr. J. B. Hamilton, general manager of Leeds City Tramways, Mr. Peter Fisher, general manager of Dundee Corporation Tramways, and Mr. A. H. Campbell, burgh engineer of Edinburgh.

Messrs. Hamilton and Fisher, in their reports, expressed the view that the estimates for construction prepared by the burgh engineer are more than ample to cover all costs of construction which it is reasonable to forecast. After having gone into figures of population, of pleasure traffic, and estimates of revenue and working expenses, they believe that the Tramways Committee need have no hesitation in recommending the construction of the line. With a capital expenditure of £185,000, they estimated a net annual surplus of £5,000. The burgh engineer had put the figure at £2,792.

Mr. Campbell, in his report, which was supplementary to one previously issued, discussed the relative costs of motor omnibuses and electric tramways. He stated that the cost of working motor omnibuses may be estimated at from 8·5d. (pre war) to 13·17d. and upwards to 16·81d. per mile run of 32 passengers (current maximum rate). The cost of working an electric tramcar may be stated at from 5·9d. to 11·44d. (current maximum rate) per car-mile of 62 passengers. The total cost of tramway operation on the Queensferry route he put at 11d. per car-mile, as against 11·753d. per omnibus-mile. Per passenger the respective costs are ·183d. for the tramcar, and ·346d. for the omnibus. The motor omnibus is in the total of operating and capital costs approximately 89 per cent. more expensive than the tramcar, seat for seat.

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MUNICIPAL TRAMWAYS.	Number of Employees at Normal Times.	Number of Employees with the Colours.	Number Joined Munition Factories, etc.	Average Allowance per Man per Week.	Amount Paid to Dependants to July 31, 1917.	Total Amount Collected on Cars.	Amount Contributed by Employees.	Number of Women Conductors.	Number of Women Drivers.
				s. d.	£	£	£		
Aberdare	65	54	—	11 0	1,521	—	220	6	—
Aberdeen	325	177	—	11 6	7,500	65	—	118	5
Accrington	125	66	5	10 4	2,454	38	71	31	3
Ashton-under-Lyne	75	54	—	14 2	2,929	38	34	23	—
Ayr	100	59	2	8 0	346	—	—	21	19
Barking	28	16	2	16 6	284	—	—	—	—
Belfast	1,080	285	1	15 5	22,520	—	1,500	—	—
Bexley U.D.C.	60	27	48	15 6	980	—	—	30	—
Birkenhead	228	90	1	10 6	4,235	4,200	200	76	—
Birmingham	3,300	1,713	—	10 6	104,029	300	2,268	990	—
Blackburn	350	210	15	10 9	6,562	—	155	51	25
Blackpool	240	91	—	13 3	4,967	—	200	75	10
Bolton	470	195	242	10 8	6,596	308	—	75	—
Bournemouth	400	240	20	11 6	12,313	12	311	—	—
Bradford	1,370	640	86	14 0	31,832	—	5,504	365	—
Brighton	300	235	2	11 1½	10,012	—	—	96	—
Burnley	439	373	5	8 3	11,053	—	—	61	—
Burton-on-Trent...	87	40	5	10 9	1,858	8	—	18	—
Bury	260	122	—	13 2	5,369	—	—	80	—
Cardiff	730	350	—	8 0	13,890	—	—	160	25
Chester	52	15	24	6 1	429	—	—	15	—
Chesterfield	90	46	2	5 4	2,141	—	150	23	12
Colchester	66	64	3	6 1	586	—	—	23	—
Colne	50	18	4	10 6	247	—	—	5	—
Coventry	314	114	—	12 5	2,037	—	307	67	5
Croydon	385	201	5	14 6	14,657	—	—	107	—
Darlington	57	38	9	7 11	689	—	52	22	12
Darwen	68	30	—	11 2	1,380	—	—	11	—
Derby	256	128	—	11 2	4,036	—	107	64	—
Doncaster	90	79	6	9 1	3,079	45	90	48	21
Dover	60	31	—	7 7	1,214	—	—	18	—
Dundee	274	162	6	—	2,013	—	142	89	—
East Ham	268	135	—	17 4	9,290	—	—	44	—
Erith U.D.C.	45	9	26	9 2	23	—	—	17	—
Glasgow	6,135	3,230	328	17 3	196,062	32,469	6,082	1,328	393
Gloucester	125	62	2	11 4	2,907	—	74	26	—
Great Yarmouth...	144	85	3	9 7	766	650	—	—	5
Halifax	423	254	18	20 3	13,047	109	—	107	—
Huddersfield	460	194	5	8 3	11,879	184	474	94	—
Hull	650	350	20	13 0	22,700	—	—	170	—
Ilford	136	53	—	—	2,424	—	—	29	—
Ipswich	188	66	21	5 0	1,723	—	—	38	—
Kilmarnock	50	25	4	7 6	369	25	—	17	7
Kirkcaldy	65	55	—	13 4	370	—	—	25	—
Lancaster...	35	13	5	9 9	619	—	—	—	—
Leeds	1,950	1,009	125	5 6	34,200	1,312	1,739	450	—
Leicester	1,005	634	4	8 2	28,415	120	545	221	—
Leith	130	78	5	14 0	1,392	490	60	50	22
Leyton	350	203	10	16 6	11,767	—	—	86	—
Lincoln	31	10	2	11 7	115	10	4	6	—
Liverpool	2,800	1,950	300	12 0	86,000	—	2,000	900	—
London County Council ...	12,612	3,201	198	19 2	288,545	387	7,380	1,532	—
Manchester	5,000	2,735	—	15 11	179,500	26,725	4,033	810	—
Nelson	41	25	—	7 1	653	—	—	6	—
Newcastle-on-Tyne	1,160	582	146	14 5	30,283	411	1,457	360	—
Newport	220	98	—	—	2,255	112	100	59	29
Northampton	147	80	3	17 0	3,392	—	31	37	—
Nottingham	622	313	127	6 0	6,893	3,377	350	184	—
Oldham	481	341	—	12 2	14,906	316	335	93	—
Pontypridd	96	80	—	9 0	1,411	—	33	25	—
Portsmouth	555	301	30	—	9,405	—	—	160	—
Preston	250	126	15	7 6	3,509	50	153	62	—
Rawtenstall	110	44	4	11 0	1,022	9	30	21	—
Reading	180	161	3	7 11	3,537	—	53	52	—
Rochdale	288	152	7	16 0	8,454	89	—	60	—
Rotherham	160	75	24	10 4	2,629	—	—	75	—
Salford	1,280	641	12	19 7	42,863	2,149	2,351	289	—
Sheffield	1,708	535	—	12 6	33,508	10,194	463	637	—
Southampton	350	183	6	11 11	11,476	—	—	100	—
Southend-on-Sea	180	115	20	8 9	4,859	—	120	50	5
Southport...	92	60	2	10 0	2,321	55	—	30	—
South Shields	140	90	5	11 10	5,240	—	—	—	—
Stalybridge	230	140	12	5 2	2,770	—	300	52	—
Sunderland	295	153	21	8 0	3,172	—	—	85	—
Swindon	45	22	—	13 8	1,662	—	—	11	—
Wallasey	238	146	1	11 0	6,993	39	254	78	—
Walsall	145	89	28	11 5	2,499	—	123	44	—
Warrington	84	40	2	14 7	1,733	—	137	31	—
Walthamstow	200	76	42	—	3,200	—	—	80	—
West Ham	781	465	—	12 2	41,395	—	—	168	—
West Hartlepool...	107	60	—	9 4	804	—	—	33	7
Wigan	300	100	1	10 3	1,935	—	171	64	—
Wolverhampton	217	106	—	—	2,889	134	156	58	—
York	130	87	2	11 0	4,061	—	—	53	6

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ACCIDENT ON DOVER CORPORATION TRAMWAYS.

COLONEL J. W. PRINGLE'S REPORT TO THE BOARD OF TRADE.

The Board of Trade published on October 29 the report of Colonel J. W. Pringle on the serious accident which occurred on August 19, when a car, getting out of control in descending Crabble Hill, overturned. The report is dated September 13, and the full text is appended :—

I have the honour to report for the information of the Board of Trade, in compliance with the instructions contained in your minute of August 20, 1917, the result of my inquiry into the circumstances attending the very serious accident which occurred on the Dover and River Light Railway at about 3.25 p.m. on August 19.

In this case Car No. 20 got out of control as it was descending Crabble Hill. The speed rapidly increased, and the car left the rails on a curve at the foot of the hill. In crossing the road to the right it overturned, and, in falling, struck the front wall of Crabble Paper Mills premises. I regret to report that the conductress and 10 passengers were either killed or died subsequently from injury ; and that all the remaining passengers (59) suffered more or less seriously from injury or shock. The driver, A. J. Bissenden, jumped from the platform half way down the hill, and escaped unhurt.

The gauge of the Dover Corporation Tramways, of which this route is a section, is 3 ft. 6 in. Car No. 20 was a double-deck, single-truck car. It contained seating accommodation for 22 inside and 26 outside passengers. The principal dimensions were as follows :—

Length over all ...	27 ft. 1 in.	Width over all ...	6 ft.
Length over body	16 ft. 3 in.	Wheel-base	6 ft.

It was equipped with :—

(*a*) Hand brake working cast-iron blocks on all four wheels by means of a handle, vertical spindle, and chain.
(*b*) Electric rheostat brake.
(*c*) Track brake, consisting of two oak-shod shoes, one between each pair of wheels, actuated by hand wheel from each platform.

The section of tramway concerned (Dover and River Light Railway No. 1) commences in London Road at the old Buckland terminus, and has a total length of 4 furlongs 2 chains. Double track is laid throughout. The first three furlongs are in London Road, and the remainder in Crabble Hill Road. In the northward direction the gradients along London Road rise continuously to the junction with Crabble Hill Road. The inclination near the summit is about 1 in 21·5 for a length of 200 yards. From the summit (X) the gradients fall as follows :—

200 ft. ...	Average 1 in 24·5	180 ft. ...	Average 1 in 12·8
90 ft. ...	,, 1 in 10·4	120 ft. ...	,, 1 in 33·0
100 ft. ...	,, 1 in 11·5		

There is a left-hand curve (radius 90 ft.) about 215 ft. from the point X, and a second left-hand curve (radius 180 ft.) about 560 ft. from X. The super-elevation on these two curves is 1·03 and 0·9 in. respectively. Crabble Hill Road is crossed by an arch carrying the South Eastern and Chatham Railway at a point 415 ft. from X.

The route was inspected in September, 1905, and opened to traffic shortly afterwards. There has been no previous case of a car getting out of control.

The Board of Trade regulations for traffic are as follows :—

(1) Speed is limited (*a*) to 12 miles an hour in London Road between Old Park Road and the junction with Crabble Hill ; (*b*) to four miles an hour from Crabble Hill Road at its junction with London Road to the Crabble Paper Mills.
(2) The track brake has to be applied to all cars before leaving the junction of Crabble Road and London Road on the downward or northward journey.
(3) All cars have to be brought to a standstill before reaching the junction of London Road and Crabble Road on the northward journey.

Driver A. J. Bissenden was formerly in the army (Army Ordnance Department). He returned to England in February, 1917, after 15 months' service in Egypt, suffering from nervous breakdown due to heat and overwork. He was discharged from the army as unfit for further military service on June 1, 1917. He applied for employment on the Dover tramways on July 21, 1917. The manager (Mr. Carden) judged he was likely to prove suitable for the position of motorman, and put him for instruction under Driver Brett, who had over ten years' service on the Dover Tramways. He was under tuition for nine days. During this time he was kept under observation, and after examination by Electrician Bond he was finally put on the list as regular motorman on August 1. Between August 1 and August 15 inclusive he drove a car daily on the level portion of the tramway system between Buckland and the Pier. On August 16 he drove a service car for the first time on the River section. Prior to the accident he had driven down Crabble Hill on service on eight or ten occasions.

On August 19 he came on duty at 10 40 a.m., and drove on the Buckland-Pier route until 1.38 p.m. After dinner he relieved, at 2.40 p.m., another driver on Car No. 20 to work the River route service. He proceeded first to the Pier, and there turned to run to the River terminus at Minnis Lane. Before reaching Buckland the conductress (Lottie Scrase) told him that the car was full, so as to avoid stopping at traffic points to pick up other passengers. Bissenden stopped the car at the foot of the hill near the Buckland tramway shed by using the hand brake, which was then working efficiently. He then proceeded up the incline in London Road, and, passing the summit, threw over his controller, and tried to stop the car at the compulsory stopping-place with the hand brake. The actual spot where the cars are accustomed to stop is about 100 ft. below the actual summit. He found the brake would not stop the car—the brake handle turning round as if something was wrong with the spindle and chain. He then tried to screw down the slipper brake, but the car was making speed so rapidly that the blocks would not hold. He then tried to apply the rheostatic brake, but could not get the small reversing handle to move into the right position. As he could do nothing more, he jumped off the front platform before the car reached the railway arch.

Other witnesses relate that a soldier (Trooper Gunner) and a gentleman (Naval Pensioner Miller) went on the front platform after the driver had jumped off it. It is not clear whether these men attempted to work the brakes or not. The impression given by the evidence of other passengers inside the car is that they appeared to be using their right hands. In any case, no retardation of speed was effected. A passenger on the top deck states that the jolt, when the car passed over the first curve, was so severe that a number of passengers who were standing on the top deck were nearly thrown off it. Passing under the railway arch the trolley pole left the conductor wire and swung loose. The conductress was on the top deck during the rush of the car down hill, and no one was observed to attempt to apply the hand or slipper brake from the rear platform.

About 140 feet below the railway arch, with speed further accelerated by the decline, the car entered the second curve and left the rails. There are clear marks on the setts of two wheels leaving the right-hand rail, but no corresponding marks of the left-hand wheels. The wheel-marks cross the road diagonally to the right for a distance of about 39 ft., and then disappear. It is evident that on this short distance the car was overturning to the right, with the left-hand wheels in the air. In falling over, first the trolley pole or standard came into contact with the wall of the Crabble Paper Mill, and then the front portion of the top railing of the upper deck. The blow broke down the wall and, as the side of the car came down to road level, the momentum carried the car forward on its side, whilst the rear end swung round to the left, so that finally, when the car came to rest, it lay on its right side at right angles to and across the roadway.

I examined the condition of the car after it had been moved to one side of the roadway. The two oak shoes of the track brake showed considerable signs of wear, but they were still in thoroughly serviceable condition. They were out of adjustment as the result of the accident, but could still be operated by the hand-wheel at each end of the car. The cast-iron wheel blocks were also adequate for service purposes. Those at the rear were tight on the wheels, with the chain taut. On the front wheels the blocks and chain were loose. It was still possible to work the hand lever operating the wheel blocks on both platforms. The controller contacts and fingers were in fair order, and there was no difficulty in moving either the controller or power handles in any of the proper directions. Generally speaking, all the brake equipment was in adequate working order, allowing for damage caused by the accident. There was also a supply of sand in the four boxes, and no evidence of choking in the sand pipes. The track is in good condition for speeds considerably in excess of that authorised.

Bissenden states that after the accident he found the front brake chain, which is wound round the spindle to bring the blocks to bear on the wheels, unhooked from the rod operating the levers. He claims that this disconnection was the cause of the failure of the hand brake to stop the car at the Board of Trade stopping-place. On the other hand, the brake was in working order, by his own account, when he stopped the car at Buckland tramway shed. Moreover, he denies that it was his practice to allow any more slack on the brake chain than was sufficient to ease the blocks off the wheels. I do not therefore think it was possible for the chain to become unhooked whilst the car was travelling a distance of about 700 yards from the tramway shed to the top of Crabble Hill. Possibly, after Bissenden jumped off the car, either Trooper Gunner or Mr. Miller, if they worked the hand brake handle, turned it in the wrong direction, and thereby caused the chain to slacken considerably off the spindle and hang loose. If this was done it is arguable that the dog was not in the ratchet, and the hand brake not applied when Bissenden jumped off the car. In the evidence at the coroner's inquest, Driver Pay, whose attention after the accident was called by Bissenden to the condition of the front brake, states that the chain was slack and loose, but not unhooked.

The evidence given by Driver Cook and Mechanic Knott, who were the first to observe the position of and remove the controller handles, is to the effect that the small handle was in the " ahead,"

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and the large in the "last power" (full parallel) position. I agree with these witnesses that no jolting or jarring during the overturning of the car is likely to have thrown both the handles into these positions, and they bear no marks of having been struck by any object.

Bissenden's own statement that he was unable to move the controller (small) handle into the emergency brake position confirms, in my opinion, the view that power was applied as the car came down the hill. The interlocking of the two handles makes it impossible to move the small handle unless the large (power) handle is in the "off" position. I proved for myself after the accident that there was no difficulty in moving the controller handle from "ahead" to "astern" or "emergency" with the power handle in the "off" position.

I come therefore to the conclusion that this lamentable accident was caused by Driver Bissenden failing to cut off power as he approached the compulsory stopping-place on the summit of Crabble Hill, and by his further failure to utilise properly the sand and brake equipment. Power was not, I think, cut off until the trolley left the conductor at the railway bridge, when the speed attained by the car probably already exceeded 20 miles an hour. It is evident that Bissenden completely lost his head at the critical moment.

I have to draw attention to three important points in connection with this accident:—

(1) Nerve and experience are necessary qualifications for tramway drivers, especially when traffic has to be conducted over severe gradients and in crowded centres. Men discharged as unfit for military duties on account of nervous breakdown are unlikely to prove suitable, two months later, as drivers on difficult routes. At all events, medical opinion should be sought before a candidate of this description is accepted. I doubt whether Local or County Appeal Tribunals are aware of the difficulties which tramway managers nowadays encounter in finding suitable substitutes to fill the places of experienced drivers taken for military service, or attracted by higher-paid employment. Possibly also they do not recognise the risk that is incurred by the public when insufficiently trained men are employed.

At my request the manager of the Dover Corporation Tramways has furnished me with information regarding the length of service, etc., of tramway drivers on the system. At the outbreak of war 24 men were employed. Of these, 16 had five or more years' service, and only four had less than one year's service. None of them were under 23 years of age. At the present moment the staff has been reduced to 18. Of these, five only have five or more years' service, nine have less than two months, two less than four months, one less than eight months, and one under 15 months' service. Six of those now employed are under 18 years of age. During the war 22 drivers have enlisted, or been claimed for military service, and 19 have left for better-paid employment. These figures speak for themselves. I do not think that the accident would have occurred had it been possible to maintain a staff of experienced drivers, such as was in existence in August, 1914. The fact must be faced that the war has materially reduced safe working conditions on tramways. It is better policy to close a route of this description, if the number of experienced drivers is insufficient to work it, than to employ men who have not, as a general rule, a year's experience to their credit.

(2) A longer training (especially with regard to the use of the rheostatic brake) and experience than that possessed by Driver Bissenden are necessary to qualify a driver to work traffic on such a section as the River route. It is evident that Bissenden's lack of familiarity with the rheostatic brake was a contributory cause of this accident. He had only used it once previously on service.

(3) Overcrowding, when a car gets out of control on a steep gradient, causes a serious list of casualties. If that can be avoided the list in an accident of this sort is likely to be comparatively small. The liability to overturn on the narrow (3 ft. 6 in.) gauge is considerably greater than on the ordinary (4 ft. 8½ in.) gauge. The determining factors in overturning, outside the gauge, actual speed, curvature, super-elevation, etc., are the height of the centre of gravity of the car and the nature of the load—i.e., fixed or shifting. The more passengers on the top deck the higher becomes the centre of the gravity. Standing passengers add to the shifting character of a load of human beings, and increase the instability

From the casualty list there appear to have been 68 passengers in the car—20 more than the seating accommodation. How many were on the upper deck is uncertain; but there must have been, from passengers' accounts, 30 or more. It was, I think, this heavy load on the upper deck, which had already been jolted violently out of position when the car passed round the first curve, which eventually caused it to overturn when it left the rails at the lower curve with a further violent jolt in the same direction.

My recommendations in the case are:—

(*a*) That only motor drivers of considerable experience (say twelve months) be permitted to work the traffic on Crabble Hill.

(*b*) That the men be familiarised with the rheostatic brake by being instructed to use it more frequently.

(*c*) That either single-deck cars be used for traffic on Crabble Hill, or no passengers be permitted to travel on the Hill on the upper deck.

DICK, KERR & COMPANY, LIMITED.

Notable Expansions and Increased Profits.

The ordinary general meeting of the shareholders of Dick, Kerr and Company, Limited, was held on October 31st at Cannon Street Hotel, E.C. Mr. Claud T. Cayley, chairman of the company, presided, supported by Messrs. R. H. Prestwich (deputy chairman), D. C. Ellis, J. Sampson, T. D. Lingard, and W. Rutherford (managing director).

The report and statement of accounts were taken as read.

The Chairman, in moving the adoption of the report and accounts, pointed out that the net profit showed an appreciable increase. The totals of assets and liabilities indicated the magnitude of the company's operations, though under present circumstances the directors were unable to publish details. The assets were £2,193,688, compared with £1,753,410 last year, the increase being chiefly made up by the difference in the item sundry investments, also increases in the items of stock in hand and work in progress, contract balances, and sundry debtors. The latter items were always liable to fluctuation from year to year, and did not call for comment. With regard to the increase in the figure of investments, this was the result of the acquisition of the shares in the United Electric Car Company, Limited. The capital expenditure at the works showed a decrease, due to the policy of writing off what was considered ample depreciation against this item, a policy which they were sure had full approval, all the more so since nobody could forecast what post-war conditions would be in the business world, and it therefore seemed essential to avoid the least possibility of inflation of the capital assets. The liabilities side of the sheet showed one particularly important variation from last year's figures, namely, the increase under the heading of creditors and estimated liabilities. This figure was £953,596, which was a large advance upon last year, although the increase was set off by the increases on the asset side of the balance sheet. The reason for this increase in the figure of creditors was that it included the reserve set aside for the excess profits duty, as although the liability under that heading had not yet been definitely settled, it was very necessary to reserve what was considered a sufficient sum to meet this charge.

Government Orders.—United Electric Car Company

The Government continued to be their principal customer, with continuously increasing demands both in quantity and variety. He wished he were allowed to tell them in detail of the ramifications of manufacture and construction which had been undertaken and successfully completed by their organisation; and still more would he have liked to tell them of what was being done now and about to be done in the immediate future. Suffice it to say that all the departments for which they were working, both at the Admiralty and the Ministry of Munitions, showed their appreciation and confidence in a very practical way, by entrusting them with important work to the limit of the company's capabilities. As mentioned in the report, the national factory erected under the company's auspices had been handed over to the Government, and they had now in hand the erection of two more factories for another purpose. These, together with the construction of important works in different parts of the country, on which it had been occupied for some time, kept the contracting department very busy, and the staff of trained engineers fully occupied. As to the controlling interest which had been acquired on the United Electric Car Company, Limited, he was glad to say that the board already felt this transaction to be fully justified, so much so that steps had been taken to extend the shops to cope with work of great importance entrusted to them by the Government. The United Electric Car Company were next-door neighbours at Preston, the works occupying an area of 15 acres, and they made a speciality of tramway car building. The directors were satisfied that after the war there would be no difficulty in keeping them fully occupied upon profitable work, and in the meantime, as already indicated, they were serving the national interests.

Last year they reported the acquisition of control in Willans and Robinson, Limited. The position had now been consolidated by the acquiring of 86 per cent. of the preferred "B" stock of that company, which had certain participating rights. This transaction was carried through partly by payment in cash and partly by exchange of shares. As it did not take place until after the close of the year under review it was not reflected in the balance sheet. Steps were now being taken to consolidate the organisations of the two companies, and considerable economy was to be expected both in selling and production. Considerable interest had been shown in the contracting world and among the legal profession in the now somewhat celebrated case of the Metropolitan Water Board *v.* Dick, Kerr and Company. This was still *sub-judice*, as although it was argued the previous week in the House of Lords, judgment had not yet been given. He had given them the position as the directors saw it at present, and it might be taken for granted their organisation and works would be fully occupied during the continuance of the war.

Organising for the Future.

Last year, and the year before, he indicated the likelihood of having to face a period of uncertainty during the transition from

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war conditions to normal conditions of peace, whatever the world had in store for us in that direction. The directors and management committee fully realised this, and therefore, in spite of the abnormal amount of work thrown upon their shoulders, particularly the latter gentlemen, they were doing what they could towards organising for the future, so as to make this transition period as short as possible. They might safely assume the immediate demand for the product of their different manufacturing works, and also of the engineering contracting organisation, would be very great, and it behoved the management to see they were in a position to step into the breach without delay. Like all large employers, they were naturally following the attitude of labour itself, and fully realised that to meet the necessities of after-the-war conditions a complete understanding and co-operation between capital and labour was both desirable and necessary. The directors and management committee had confidence that all would be well in this direction, provided labour was met in a spirit recognising that an entirely new basis of relationship must be established. If the country and the empire met the new conditions that were bound to arise after the war fairly and squarely by adopting new methods of empire and international commercial relationship, he thought the internal relationship of employer and employed could safely be left to the commonsense of those directly concerned. In concluding, the chairman said that the particulars were given very fully in the report, and that further comment was unnecessary. In the liabilities was included the sum set aside to meet excess profits tax. The assets included £762,000 for stock and materials, which, though apparently large, was not large when they considered the extent of the business operations. He moved that a dividend of 10 per cent. be paid on ordinary shares and the payment on preference shares be confirmed.

Mr. R. H. PRESTWICH seconded, and the motion was carried unanimously.

Mr. PRESTWICH moved the re-election as directors of Mr. C. D. Ellis and Mr. Cayley, the chairman. He could not speak too highly of the services rendered by those gentlemen, the latter's services during the last two years having been exceptionally valuable. The special knowledge he possessed had been of the greatest assistance to the management committee.

Mr. T. D. LINGARD seconded, and the motion was agreed to unanimously.

The CHAIRMAN thanked the shareholders for his re-election and assured them that his services would always be at the service of the company. He had done his best, but they would all see that the position of the company was now entirely different from what it was two and a half years ago. He paid a high tribute to Mr. Rutherford who, he said, had been a wonderfully apt pupil, who really knew more about it than he did himself.

Mr. ELLIS also briefly acknowledged his re-election.

Messrs. Gane, Jackson, Jefferys and Freeman were re-elected auditors.

APPROVAL OF THE BOARD'S POLICY.

Mr. E. J. FOX, in proposing a vote of thanks to the chairman and directors, said he wished to congratulate the board on the policy which they had adopted in extending the company's business. He was certain that in the future companies such as Dick, Kerr and Company would have to meet competition that would arise by combination and absorption, and he congratulated the board on having absorbed or amalgamated with Willans and Robinson and the United Electric Car Company. There was an old saying that any industrial concern which stood still was going back, not by virtue of standing still, but by virtue of its competitors gradually outstripping it, and he wished to support the policy that the board had adopted in gradually extending. As far as he knew this was the first industrial company in this country which had adopted the policy of acknowledging its officials by constituting them a management committee. He was perfectly certain that by taking the staff into their confidence, as obviously they were doing, the directors were very much strengthening not only their own position but the position of the company as a whole. In conclusion, he wished particularly to mention the name of Mr. Rutherford, the managing director, who was very largely responsible for the success which the company had achieved.

Mr. PARKER seconded, and asked if it was contemplated to pay interim dividends on the ordinary shares.

The motion was carried by acclamation, and

The CHAIRMAN, in reply, thanked the shareholders for their expression of confidence and approval. He could hold out no hope of the payment of interim ordinary dividends, as the work that would be thrown upon the already overpressed auditors forbade that course. He pointed out that the work accomplished by the managing director was exceptional, and it was marvellous what had been done. They all appreciated the kind words of the mover and seconder.

The report for the 12 months ended June 30, 1917, which was adopted by the meeting, states that the company has again had a very prosperous year. A dividend of 10 per cent. per annum is recommended on the ordinary shares and £36,073 is carried forward. The previous dividend was 6 per cent., and £20,397 was carried forward. As a year ago, a special reserve of £25,000 has been made for contingencies. The profits amounted to £95,465, and including the amount brought forward there is a total sum available of £115,862, which has been allocated as set out in the table below, in which a comparison is given with the results of the four preceding years:—

	1917.	1916.	1915.	1914.	1913.
	£	£	£	£	£
Net profits	95,465	71,740	46,959	44,761	30,092
Balance from last year...	20,397	18,347	25,526	10,325	10,016
	115,862	90,087	72,485	55,086	40,108
Debenture interest and trustees' fees ...	10,188	10,490	10,538	10,961	11,183
Premium on debenture stock redeemed ...	300	300	300	300	300
Dividend on 6 per cent. preference shares ...	18,300	18,300	18,300	18,300	18,300
Dividend on ordinary shares ...	26,000 (10%)	15,600 (6%)	—	—	—
Reserve against contingencies	25,000	25,000	25,000	—	—
Balance carried forward	36,073	20,397	18,346	25,525	10,325

Although the amount of excess profit levy under the Munitions of War Act has not been finally settled, the directors believe that the reserves which they have made in the accounts for extra depreciation, special taxations, etc., are sufficient. The work carried out during the year by all departments on behalf of the Government has been of even greater magnitude than in any preceding year. The national factory, to which reference was made in the previous report, has been completed and organised and was handed over to the Government as a going concern in July last thus releasing a large number of the company's staff for development work in other directions. The company has acquired control of the United Electric Car Company's undertaking by the purchase of the greater part of the issued preference and ordinary shares in that company. Steps have been taken to amend the articles of association of the Car Company so as to enable Dick, Kerr and Company, Limited, to retain control so long as it continues to hold the ordinary shares. The directors therefore intend to dispose of the preference shares so as to replace the capital of the company temporarily invested therein. Before offering the shares for sale elsewhere, the directors invite applications from share and debenture holders of Dick, Kerr and Company, Limited, for the purchase of these preference shares at par. The capital of the United Electric Car Company consists of £100,000 in 7 per cent. cumulative preference shares of £1 each, and £150,000 in ordinary shares of £1 each, making a total of £250,000 issued share capital. No debenture stock has been issued. The works of the Car Company are situated at Preston, adjoining the works of Dick, Kerr and Company, and can be very conveniently operated under one management. The output will be sold through Dick, Kerr and Company's selling organisation, and it is expected that a considerable increase in business and reduction in expenses will result.

FINANCIAL REPORTS AND MEETINGS.

Straker-Squire, Limited, have declared an interim dividend of 1s. per share.

Sao Paulo Light and Power Company announce a dividend of 2½ per cent. on the common stock.

Babcock and Wilcox, Limited, are paying an interim dividend of 6 per cent., the same as a year ago.

Shanghai Electric Construction Company are paying an interim dividend of 5 per cent. (10s. per share).

Rio de Janeiro Tramway, Light and Power Company announce a dividend of 1¼ per cent. on the capital stock.

Calcutta Tramways.—The directors have paid an interim dividend on ordinary shares at the rate of 2½ per cent., free of tax.

Lancashire Dynamo and Motor Company.—A dividend of 5 per cent. (actual) on ordinary shares, free of tax, is announced.

Buenos Ayres Tramways Company announce a dividend of 1s. 3d. per share (5 per cent. per annum) for the three months ended September 30.

Montreal Heat, Light and Power Company, Limited, have declared a dividend of 2 per cent. on the paid-up capital stock for the quarter to October 31.

The Grimsby Electric Vehicle Company, Limited, has been registered with a capital of £5,000, to undertake the manufacture of electric vehicles.

Lima Light, Power and Tramways Company have declared a dividend of 1¾ per cent. in Lima on the shares payable against coupon No. 14 in London.

Brisbane Electric Tramways.—An interim dividend at the rate of 8 per cent. per annum (4s. per share), free of income-tax, has been declared on ordinary shares for the past half-year.

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Hurst, Nelson and Company, Limited.—The profits for the year ended July 14 were £78,770, and £14,989 was brought forward. A dividend of 10 per cent., and a bonus of 2½ per cent., is proposed on ordinary shares, free of income-tax, adding £20,000 to the reserve, and £18,074 to the depreciation fund.

Bolckow, Vaughan, and Company, Limited.—The trading profits for the year ended June 30, 1916, after providing for depreciation and estimated liabilities under the Excess Profits Duties and Munitions Levy Acts, were £510,185, and £135,707 was brought forward. Debenture interest absorbed £34,495, and dividends amounting to 11 per cent. were paid on ordinary shares. It is proposed to add £150,520 to the reserve (raising that fund to £250,000), and to carry forward £126,180. The board recommend a further distribution of 8½ per cent. for the past year on ordinary shares, making 12 per cent. for the twelve months. For 1914-15, the trading profit was £223,315, and the dividend 6 per cent. Owing to the new Finance Act having superseded the financial provisions of the Munitions of War Act, and to a further complication having been introduced by the Government taking control of the coal mines, the directors are obliged to defer the presentation of the balance sheet for the year ended June 30, 1917.

Paying Wages out of Capital.—Presiding at the ordinary meeting of the Dumbarton Burgh and County Tramways Company, in Edinburgh, on September 12, Mr. George Balfour said that he viewed with the gravest apprehension the position in which this country would be placed as soon as the short burst of activity immediately following the war operations had passed away. The great mass of industrial workers in this country were being unfitted to stand the shock which must come, and the blame rested not so much with the workers as with those in authority, who, through lack of knowledge or lack of a sense of responsibility, either encouraged or acquiesced in conditions which were economically insupportable. They seemed to lose sight of the fact that at the present moment the greater portion of the wages distributed in this country was provided out of the capital funds of the country, and while this was inevitable in war time, it was a process which could not continue for many years without vitally sapping our national strength.

Wallasey Corporation Tramways.—The receipts for the year ended March 31, 1917, amounted to £70,756, an increase of £4,435, the receipts per car-mile being 13·58d., as compared with 12·92d. Working expenditure, including £2,749 war allowances to employees, was £45,861, or 8·80d. per car-mile, compared with £44,569, or 8·68d. per car-mile, or a net increase of £1,292. This amount is made up of various items, additional wages accounting for £1,050. The net revenue, together with £1,938 brought forward, was £27,025. After providing for capital charges, including interest, £6,462; sinking fund, £4,099; and instalment of loans, £1,106, the balance of £3,000 was passed to the depreciation and renewals fund, £8,500 was paid to the general district rate, and £3,858 carried forward. The passengers numbered 15,125,641, an increase of 819,020, and the mileage run 1,249,807, or 18,338 miles in excess of 1916. Mr. R. R. Greene, general manager, remarks that the receipts constitute the highest in the history of the undertaking, and indicate its continued and steady progress. It has been possible during the year to effect only necessary repairs in maintenance and upkeep of rolling stock and the manager warns the committee that a large amount will have to be expended when normal conditions return.

Blackpool Corporation Tramways.—For the year ended March 31, 1917, Mr. Charles Furness, borough electrical engineer and tramways manager, reports that the income amounted to £96,224, and working expenses to £55,085, leaving a gross profit of £41,139, which has been allocated as follows:—Interest and sinking fund charges, £19,956; reserve fund, £2,183; permanent way renewal fund, £9,000, leaving £10,000, which has been paid in aid of rates. The sum so contributed is equivalent to 24·3 per cent. of the gross profit. After providing for interest and sinking fund charges, the available surplus represents 6·67 per cent. on the capital outlay. Total receipts show an increase of 20·2 per cent.; working expenses, 22·3 per cent.; gross profit, 17·4 per cent.; and net surplus, 30·2 per cent. Passengers carried amounted to 3,224,687, or 22·1 per cent. more than in the previous year. The revenue is the highest in the history of the department, but the net profit is only the second best, falling short of the 1914 record by £3,300. Referring to expenditure on the permanent way, Mr. Furness remarks that too much emphasis cannot be laid on the necessity of building up a very substantial fund, as extensive renewals cannot be carried out under present circumstances or probably for some time to come.

Bradford Corporation Tramways.—In his nineteenth annual report, Mr. C. J. Spencer, general manager, remarks that although the difficulties of operation have been increased owing to the restricted lighting of the cars and streets, the replacement of employees who have left to take up military duties, and the limited supply of material, a considerably larger number of passengers has been carried. The drain upon the staff has been met in the main by the employment of women. The expenses show an increase of £8,816, and the allowances to dependants of employees have increased by £6,013, to £14,351. The revenue for the year ended March 21, 1917, amounted to £356,025, and working expenses to £267,460, leaving a gross profit of £88,565, an increase of £1,893. After payment of interest and sinking fund and other charges, and allowances for reserves and renewals, £3,400 has been appropriated to the city funds in relief of rates. The appropriation the previous year was £25,000. The traffic revenue, excluding the railless system, amounted to £326,406 against £314,486 last year, an increase of £11,920. Although there was a decrease in the car-mileage of 148,210, or 2·5 per cent., the revenue increased 3·79 per cent., raising the receipts per car-mile from 12·842d. last year to 13·674d. The cost of labour has risen to 58 per cent. of the total expenditure. The effect of the restricted staff and the difficulty of procuring material is shown by the decrease of £9,344 in the cost of repairs to cars. Mr. Spencer remarks that if commodities and rates of pay remain at their present high level the question of raising fares will have to be considered in the future. Large sums of money will be required to restore the undertaking to its pre-war level, and the manager impresses upon the committee the necessity of building up the reserve funds to meet the inevitable position after the war.

CONTRACTS AND ORDERS.

Dublin Corporation Electricity Committee have accepted a tender for a Green's economiser.

British Insulated and Helsby Cables, Limited, have an order for the supply of trolley wire to Glasgow Tramways Committee.

British Hele Shaw Patent Clutch Company's offer of 162 steel pinions at £212 has been accepted by Bradford Corporation.

Messrs. Gabriel and Company, of Birmingham, are supplying brake ratchets and bell springs to Portsmouth Corporation Tramways.

Mellowes, Limited, are carrying out glazing repairs at the central car repair depot of the London County Council Tramways at a cost of £623 18s. 3d.

The Sterling Boiler Company's tender for boiler equipment with stoker, fans, chimney, etc., at £19,822 has been accepted by Wolverhampton Corporation.

The Ocean Accident and Guarantee Corporation have agreed to insure four additional Austin wagons belonging to Marylebone Council against all risks at an annual premium of £12 each, less 15 per cent.

Wolverhampton Corporation have placed the following orders:—British Thomson-Houston Company, Limited, 5,000-KW. turbo-generator at £17,803; Allen and Company, condenser body at £6,083; Willans and Robinson, Limited, condenser plant auxiliaries, at £3,729.

Rotax Motor Accessories Company, Limited, are supplying a rolling mill to London County Council at £120 in connection with the production at the central car repair depot of hard-rolled copper strip for controller segments and fingers required in connection with the repair of tramcars.

Bradford Electricity Committee have placed a contract with Parsons and Company, Limited, for a 12,000-KW. turbo-generator at £45,775. The Council have also decided to place an order without delay for a condenser. It was stated at a meeting of the Corporation on October 28 that the plant at Valley Road station is at present fully loaded.

London County Council Tramways.—The following firms have executed the re-winding of armatures for car motors:—The Manchester Armature Repair Company (£610); Johnson and Phillips, Limited (£300); Home and Rowland (£206 17s.); H. Dunn and Son (£51); British Westinghouse Electric and Manufacturing Company (£167 10s.); the Magic Appliances, Limited (£96). Tenders for the supply of 3,724 yards of trolley wire have been received from the British Insulated and Helsby Cables, Limited, £396 2s., and from Frederick Smith and Company, £398 17s. The former was accepted. The Highways Committee have reported to the Council the following particulars of various works for which they have arranged in connection with Greenwich generating station:—

(1) Purchase for £20 16s. 4d. from J. Hopkinson and Company, Limited, of two valves for repairing boilers.
(2) Purchase for £64 10s. from the Power Plant Company, Limited, of two sets of double helical gears.
(3) Purchase from the British Westinghouse Electric and Manufacturing Company, Limited, of a steam chest for No. 1 turbo-alternator for £177 10s., this being one-half the cost, subject to the old steam chest castings becoming the property of the company. Further expenditure of £20 sanctioned for fixing the chest.
(4) Purchase for £235 10s., from Babcock and Wilcox, Limited, of a set of stoker links for the boilers.
(5) Repair for £53 19s. 4d. by the Electric Construction Company, Limited, of a motor and choker and switch.
(6) Purchase for £43 from the British Westinghouse Electric and Manufacturing Company, Limited, of a high-pressure gland with paddle wheel casing for turbo-generators.

During the recess the following tenders were received for the supply of electric cables:—Western Electric Company, Limited, £1,430 (accepted); W. T. Henley's Telegraph Works Company, Limited, £1,462; Callender's Cable and Construction Company, Limited, £1,469; British Insulated and Helsby Cables, Limited, £1,480; Johnson and Phillips, Limited, £1,480; Siemens Brothers and Company, Limited, £1,490; W. T. Glover and Company, Limited, £950 (part only). The following tenders were accepted for the supply of 1,500 driving wheel and 750 pony wheel tires for tramcars:—Brown, Bayley's Steel Works, Limited, £7,294 7s. 6d., and the Patent Shaft and Axletree Company, Limited, £7,990 12s. 6d.

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PERSONAL.

Mr. M. Bell has been appointed superintendent at West Bromwich generating station at a salary of £300 per annum.

Mr. H. Dickinson, city electrical engineer, Liverpool, has been granted an increase in salary from £1,500 to £1,600.

Sir Boverton Redwood, director of petroleum research, has been appointed director of technical investigation in the Petroleum Executive.

Mr. Sydney Morse, owing to the Government having requisitioned his offices at No. 1, Kingsway, has removed to 79, Queen Street, Cheapside, E.C.4.

Mr. H. S. Ellis, electrical engineer of South Shields, has been given permission to accept the appointment of Coal Controller's representative for the district.

Councillor A. M. Jarmin, who has accepted the mayoralty of Ipswich for the ensuing year, has done much useful work as chairman of the Tramways Committee.

Mr. Henry Clayton has been recommended by Preston Corporation Tramways Committee for appointment as assistant engineer and manager at a salary of £200 a year.

Mr. H. R. Docker, second class assistant in the London County Council Tramways department, has been appointed time tables assistant at a salary of £262, rising to £300.

Mr. T. Ridyard, rolling stock and works superintendent, Liverpool Corporation Tramways, has been granted an increase in salary from £400 to £500, increasing in twelve months to £550.

Mr. Thomas E. Allan, of South Park, Lincoln, has joined the board of Robey and Company, Limited. Mr. Allan has been associated with the management of the company for some time.

Mr. James Briggs, assistant engineer of the Midland Railway Company, has been appointed chief engineer to the company, in succession to Mr. W. B. Worthington, who has retired owing to ill-health.

Mr. T. Coole, engineering assistant in the Liverpool Corporation Tramways department, has been granted an increase in salary to £500 per annum, with a further £50 a year hence, a total increase of £150 on his present salary.

Mr. H. W. Woods, senior charge engineer, Manchester Corporation electricity department, has been appointed a charge shift engineer at Greenwich power-station of the London County Council Tramways at a salary of £250, rising to £300.

Sir Maurice Fitzmaurice, C.M.G., has been appointed to fill the vacancy on the Advisory Council of the Committee of the Privy Council for Scientific and Industrial Research caused by the retirement, by rotation, of Mr. W. Duddell.

Mr. F. H. Corson, electrical engineer and manager, Gloucester City Tramways, has been appointed local representative of the Coal Controller in the West of England. The Electricity Committee congratulated Mr. Corson on the appointment.

Doncaster Corporation have granted increases of £50 per annum to Mr. G. A. Roberts, acting electrical engineer, and Mr. T. Potts, acting traffic manager of the tramways, during the absence of Mr. E. S. Rayner, the manager and electrical engineer.

Mr. W. B. Worthington, engineer-in-chief of the Midland Railway Company, having, from considerations of health, resigned the presidency of the Institution of Civil Engineers, Mr. Harry E. Jones, the vice-president, has been elected president for the year 1917-18.

Mr. E. P. Austin, who has been chief engineer at Chesterfield Corporation Electricity Works since 1906, has been appointed chief electrical engineer at the Sheep Bridge works. In accepting Mr. Austin's resignation, the Electricity Committee recorded their appreciation of his energy and ability.

Mr. N. Bradwell, who has been in the service of Sheffield Corporation Tramways for sixteen years, has been elected assistant general secretary of the Amalgamated Association of Tramway and Vehicle workers. Four candidates competed for the post, and out of 32,000 votes Mr. Bradwell was awarded 24,686.

Sir Francis Hopwood, upon whom the King recently conferred a peerage, has assumed the title of Baron Hopwood of Rosyth. Sir Francis Hopwood, after being private secretary to the President of the Board of Trade, became secretary of the Railway Department in 1893, and held the position of permanent secretary to the Board from 1901 to 1907.

Mr. R. C. Bullough, general manager and engineer, Colchester Corporation Tramways, was recently granted an increase in salary. The Council also adopted a recommendation by the Tramways Committee congratulating Mr. Bullough on the efficient working of the tramways during the greatly increased traffic of the last three years, and expressing satisfaction at the freedom from serious accidents and the greatly improved revenue.

Alderman J. H. Hargreaves, who for many years, until a year or so ago, rendered great service to Hull Corporation Tramways as chairman of the committee, was on October 22 presented by the citizens with his portrait. The Alderman was the first Lord Mayor of Hull, which position he occupied for three years, resigning his chairmanship of the Tramways Committee in the third year owing to the strain entailed on the mayoral duties by war work. The fund for the presentation amounted to about £800, and the ex-Lord Mayor was also handed an ebony walking stick, gold mounted, and bearing the city arms. Mrs. Hargreaves received a diamond ornament.

We regret to record the death of **Mr. Frank Woodhead,** rolling stock superintendent of the Walsall Corporation Tramways and motor department. Mr. Woodhead had held the appointment since September, 1903, and was formerly on the engineering staff of the Bradford Corporation Tramways.

The Late Alderman J. Brodie.—Mr. Charles Furness, general manager of Blackpool Corporation Tramways, in his report for the past year, alludes to the late Alderman Brodie, and states that he occupied the position of chairman of the Tramways and Electricity Committee uninterruptedly from 1896 to his death, and during this time played a prominent part in the administration of these departments. He was proud of his long association with these undertakings, and their prosperity and success are to a large degree due to the staunch support the officials always received from him. His genial presence will be sadly missed.

WITH THE FORCES.

Pioneer J. Fetter, signal section, Royal Engineers, who has been awarded the Military Medal, was an employee of Aberdeen Corporation Tramways Department.

Lance-Corporal Alex Brown, R.E., formerly an electrician with Dick, Kerr and Company, Ltd., at Preston, has won the Military Medal. The distinction was awarded for laying a cable under heavy fire.

Sergeant H. W. Hughes, Royal Warwickshire Regiment, formerly a motorman on Birmingham Corporation Tramways, at the beginning of the war enlisted in a Territorial Force battalion of the county regiment. In 1915 he took part in the fighting in France, and at the battle of the Somme he was wounded. On recovery in England he returned to his battalion last November, and in February of the present year he was recommended for a commission, which was bestowed after he had passed a course of instruction.

Second-Lieutenant A. E. Conibear, King's Liverpool Regiment, who has died from wounds received in action in France on September 20, previous to the war was a Bristol tramways conductor.

We regret to learn that a son of **Mr. W. B. Cownie,** managing director of the National Electric Construction Company, Limited, has been killed. He was attached to the Royal Flying Corps.

Lance-Corporal J. Walmsley, Loyal North Lancashire Regiment, who was awarded the Military Medal in July, has been killed in action. He was formerly employed at the Preston works of Messrs. Dick, Kerr and Company, Limited.

REGULATION OF LONDON CARS IN AIR RAIDS.

At a meeting of London County Council on October 16, Mr. G. H. Hume, chairman of the Highways Committee, in answer to questions, stated that it was in compliance with an order issued in November, 1916, by the Field Marshal Commanding the Home Forces, that drivers and conductors had been required to continue their journeys during air raids. In view of recent experiences, however, it had been arranged that cars might be brought to a standstill, and the motormen and conductors might take cover during gun fire in the vicinity.

The following notice to motormen and conductors was subsequently issued by Mr. A. L. C. Fell, general manager:—

I am now instructed by the Commissioner of Police to state that in view of the recent experiences it has been decided, with the assent of the Field Marshal, that notwithstanding Section 2 of the Order made on November 2, 1916, embodied in General Orders Nos. 683 (amended) and 685, cars may be brought to a standstill, and the motormen and conductors may take cover after, but not before, anti-aircraft gunfire is heard *in the vicinity*, and after the following instructions have been carried out:—

(1) Should any car be on a gradient it must be driven to a section of track which is comparatively flat.

(2) Cars must not be close poled.

(3) Cars must not be left at intersections of crossing streets.

(4) The hand brake of the cars must be applied to the fullest extent, and the brake ratchet wheels dogged.

(5) The controller handles must be removed if a motorman leaves his car to take advantage of the nearest cover.

Motormen and conductors should rejoin and proceed with their cars as soon as gun-firing has ceased *in the vicinity*.

I confidently appeal to the patriotism of all affected by this notice to make these arrangements a success. It is of the greatest importance in the national interest that the tramway services, which are essential for the transport of munition workers and the public generally, should be maintained if possible, and in any case resumed with the utmost despatch when the danger is over.

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TRAMWAY AND LIGHT RAILWAY NOTES.

BOLTON.

SIX-DAY WEEK FOR EMPLOYEES.

The Tramways Committee have authorised the general manager to prepare a scheme for six days' work for all employees in the department.

BIRKENHEAD.

THE COLLECTIONS FOR WAR OBJECTS.

During the past 23 months, the amount received through collections on the Birkenhead tramcars on behalf of various charities amounted to nearly £4,400.

BOURNEMOUTH.

LONG DISTANCE PASSENGERS.

Christchurch Council have asked Bournemouth Tramways Committee if anything can be done to prevent the displacing of through passengers by people who use the cars for short journeys. A reply has been sent that the committee have no power to prevent passengers travelling who require to go short distances only, and that as soon as more motormen are available a larger number of cars will be run. A Bournemouth newspaper adds that a "twopenny fares only" plan has been adopted with regard to cars running along Lower Parkstone route, and that the plan is not popular.

BRADFORD.

ANNUAL HOLIDAY OF THE OVERHEAD STAFF.

The recommendation of the Tramways Committee that the overhead staff in the tramways department should be allowed a fortnight's annual holiday, commencing next year, instead of a week as at present, has been approved by the War Wages Committee, to which it is referred.

DUBLIN.

COMPENSATION TO COMPANY.

Mr. Duke, replying to a question in the House of Commons on October 25 by Mr. Nugent, said that the sum of £1,820 5s. 6d. had been paid to the Dublin United Tramways Company in respect of material damage to their property during the rebellion, including buildings, their contents, wiring, pillars, and permanent way. The Property Losses Committee was precluded by its reference from entertaining claims for loss of wages of employees, and there were no funds at the disposal of the Irish Government for making such claims. The only tribunal competent to consider a claim of this character was the Defence of the Realm Losses Committee, and he understood that it would shortly hear a claim which was regarded as a test case.

HULL.

COMPARISON OF RECEIPTS PER MILE—NIGHT SERVICE AS AID TO PUBLIC SAFETY.

A statement has been presented to the Tramways Committee by Mr. W. J. McCombe, the manager, showing receipts per mile run after 10.45 p.m. on weekdays and 10 p.m. on Sundays. The average earnings are 5·96d. per car-mile, while the working charges average 6·9d. Mr. McCombe pointed out the fact that there were other periods when cars were not running at a profit; this is found to be the case between 10 a.m. and noon, and between 3 and 5 p.m., practically the same service being run during both periods. It had been suggested that the cars should cease running at 11 p.m. on weekdays and 10 p.m. on Sundays. Councillor Exley thought that it would be safer for the public and the employees if the cars stopped earlier; but Councillor Raine, deputy chairman, considered it better to get the people off the streets, and that was the reason for continuing the present service. It was agreed that no change should be made.

IPSWICH.

HIGH COST OF MATERIALS.

In his report for the past year, Mr. Frank Ayton, general manager of the Corporation tramways, cites the following examples of the increased cost of materials:—Lubricating grease, 89 per cent.; oil for cars, 123 per cent.; steel tires, 255 per cent.; armature coils, 89 per cent.; copper trolley wire, 110 per cent.; stranded steel wire, galvanised, 60 per cent.; and steel check rail bars, 120 per cent.

LEEDS.

INCREASED CAR LIGHTING.

By the permission of the Home Office, an improvement has been effected in the lighting of the Leeds cars by the alteration and removal of some of the shades around the lamps.

LIVERPOOL.

CLAIM FOR NEGLIGENCE IN FALL OF A WIRE.

In the Court of Passage, Liverpool, on October 25, Judge Taylor gave judgment in an action in which a woman claimed damages for injuries sustained from part of a falling overhead wire. The judge said the mishap occurred at a section insulator. For plaintiff, an expert said there was no explanation except that the copper screw had not been tightened, and that, therefore, it had become unscrewed by passing traffic or by vibration. The Corporation expert held that it was wrong to draw that inference, and that one ought to assume that some accident had happened. That no accident of the kind had happened before was, the judge thought, extraordinary when one considered the years the system had been working. The mishap was not due to negligence, he was satisfied, and he gave judgment for defendants.

LONDON.

EXPERIMENTS IN WELDING OF TEE RAILS—FOUNDRY EXTENSION TO MEET THE CASTINGS SHORTAGE—PUBLICITY DEVELOPMENT—EMPLOYEES' DEMANDS—ACCIDENT CLAIMS—INCREASED COAL FREIGHT RATES.

The Highways Committee of the London County Council reported on October 30 that they had sanctioned expenditure not exceeding £50 for the installation, for experimental purposes, of a special apparatus for welding conductor tee rails. In view of the serious difficulty in obtaining supplies of castings for the maintenance of rolling stock, the existing foundry facilities at the central car repair depot have been extended, the work involving the provision of a temporary building at an estimated cost of £480, and the supply of machinery at £350, the erection of the building being carried out by the tramways department. Some months ago the Council appointed Mr. T. E. Thomas (commercial superintendent of the District Underground Railway and the London General Omnibus Company) as head of the new depelopment and publicity section of the tramways, at a salary of £800 per annum. The appointment of the staff was deferred. On October 30 the Highways Committee reported that they regarded the present time inopportune for making a permanent appointment of a publicity assistant, and they recommended that, as a temporary measure, a woman be engaged to assist in the publicity work. This step was agreed to. Applications from employees in the traffic, rolling stock, and permanent way branches for increased remuneration have been referred to the appropriate conciliation boards. The traffic employees asked for an increase of 100 per cent. on pre-war rates. Arising from a quarter's accidents in connection with the tramways, 333 claims have been settled, the costs having amounted to about £3,698. In six other cases actions were brought; in three of these a verdict was given against the Council, two resulted in their favour, and one was withdrawn. Owing to increased rates for freight, an additional expenditure of £22,200 will be required for coal for Greenwich station during the current financial year.

MANCHESTER.

INCREASED FARES NECESSARY.

Two months ago Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, recommended that the Tramways Committee should consider the question of increasing the fares, in consequence of the continued rise in operating costs and the demand of the Finance Committee that tramways should continue to make the same grant in relief of the rates. At the Council's October meeting the Committee were directed by 57 votes to 38 to consider a revision of the fares, although Alderman Bowes, the chairman, said they would first like to know whether the Trading Profits Committee intended to ask for the same amount to continue to be voted to the relief of rates.

MANSFIELD.

AN EXTENSION OF TIME.

An application has been made by the Mansfield and District Light Railway Company for an extension of time until April, 1921, for the completion of tramway extensions at Sutton-in-Ashfield and Skegby.

NEWCASTLE-ON-TYNE.

REDUCTION IN STOPPING PLACES—LIBERATING MORE CARS FOR MUNITION WORKERS.

The Tramways Committee have decided upon important alterations in the services. The constant pressure for an increased service for workmen shows no diminution. The management has at the same time to deal with the difficulty of maintaining a regular service in winter, when driving is more dangerous owing to greasy rails, inexperienced drivers and darkened streets, and there is also more danger from drivers of vehicles. The service will be curtailed on certain routes, but an endeavour has been made to rearrange the times so as to provide a more regular service on all routes, while more cars will be liberated for workmen. With this end in view the number of stopping places has been revised with the object of minimising time. The committee are of opinion that the railways must be called upon if anything more is required. The committee ask ladies to do their shopping early in the day, and urge the public to avoid using the cars between 4 and 6 p.m.

NEWPORT.

LIGHT RAILWAY EXTENSION.

The Light Railway Commissioners have recently confirmed the Newport Light Railway Order, 1917, authorising the construction of a light railway in the county borough of Newport. The line will extend the tramways to the docks and serve important war works which have just been erected.

OLDHAM.

CARELESSNESS OF MOTORMEN—EMPLOYMENT OF EX-SOLDIERS.

In one recent week two Oldham motormen were dismissed for carelessness, and the tramways department states that nowadays

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there is great deterioration in the material available for training. There were ten collisions with other vehicles in two weeks and five collisions between cars. In order to prevent drivers attaining too much speed and running past passengers, the manager has been empowered to fix a compulsory stop midway between the Black Horse Hotel and Royal Oak Hotel compulsory stops. At a meeting of Oldham Tramways Committee, Mr. Priestley, the manager, reported that the employment of discharged soldiers on the tramways was not having satisfactory results. He said that they did not seem prepared to take the responsibility attaching to the work. Many of them flatly refused to work a full week, on the ground that if they did so their pensions would be stopped. The men were taken on because the staff was so seriously reduced. Soldiers seemed to come back from the army with the idea that there was a place open for them wherever they liked to go. Some of them were not in good health, and that also interfered with their work. The men, however, of whom he complained seemed to be physically fit, but apparently they only wanted to draw sufficient money to keep themselves going along with their pensions. They wanted, in fact, to do as they liked. Several members of the committee expressed regret at the state of matters disclosed.

PORTSMOUTH.

Women Drivers.

Having lost 71 per cent. of their motormen to the Services, the management of Portsmouth tramways have had to restrict the car service. Only a few of the former employees have yet been discharged from the army unfit for further service. These are not in a condition to return to their original occupations, and are being kept on at other work in the department. A last effort is now to be made to secure men who can be trained as motormen, and if it proves unsuccessful the Tramways Committee contemplate employing women as drivers.

SHEFFIELD.

Additional War Allowances to Employees—Permanent Way Maintenance.

The Tramways Committee has recommended that from August 20 an additional war allowance of 3s. per week to male employees and 2s. per week to female employees in the tramways department be granted to all such employees as are in receipt of wages of less than 50s. per week, with the exception of those employees in the engineering trades who recently received the allowance under the award of the Committee on Production. In his report for the year ended March 25, 1917, Mr. W. J. Hadfield, city surveyor, states that the expenditure on tramway permanent way was £23,015, a decrease of £3,040 as compared with the previous year. Several junctions were replaced and 7,664 joints were welded. In addition, 412 joints and 10 points and crossings were repaired by electrically welding steel to the surface of the worn rail ends.

SWANSEA.

Tramway Rents.

The Tramways Committee have agreed to the annual rents payable by the Tramways Company being fixed at about £6,000 per year, the Corporation to retain their existing powers regarding repairs, etc. The agreement is to be embodied in the new lease to include the whole undertaking. Under the old agreement several sections had to be re-leased to the company right up to 1980 before the Corporation could exercise its power of purchase, but in 1911 the various periods were equated to one date (about 20 years' time).

WALSALL.

Boy Scouts as Conductors.

Walsall Tramways Committee has decided to accept the offer of the service of boy scouts to assist the conductors at the busy times.

WARRINGTON.

Increased Expenses.

Alderman Wilkinson at a recent Council meeting discussed the position of the tramway undertaking, and said that while the tramways had held their own without increasing prices until now, the straining point had come. War bonuses had increased to £3,600 per annum. Prior to 1914 the cost per car-mile was 8d.; to-day it amounted to 11¼d. per car-mile. On the omnibuses they had been losing money all along. Unless additional revenue was obtained, the deficit would have to be met out of the rates.

WIGAN.

Damages in the Overturned Car Case.

Seventeen claims for damages arising out of the accident on the Wigan Corporation tramways on July 26 last year, when a crowded tramcar was ovetrurned and a number of passengers injured, one fatally, came before the County Court Registrar on October 24. A test case had already been brought, when judgment was given in favour of plaintiff for the full amount, £45, and costs. The Corporation appealed, but the judgment was upheld. The damages awarded in the 17 cases amounted to £488 19s., as compared with £642 13s. claimed. Negligence was alleged in allowing the car to be overloaded, driving at an excessive speed down an incline, and failure to maintain the car and the track in proper order.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

Applications for Letters Patent.

Motor vehicles (14,259)—F. J. Brougham (*Mustad*).
Engines for traction on centre rail railways (14,137)—G. N. Fell.
Prevention dead lines at line crossing or junctions on electric tramways (14,169)—W. J. Fenge.
Control of fuel supply to engines of motor vehicles driven by gas (14,183)—A. Halsall.
Driving gear for motor vehicles (14,276)—F. H. Mingay.
Motor vehicles (14,237)—W. Mulholland.
Railroad tie and rail fastener (14,195)—C. E. Peterson.
Lifting jacks (14,173)—F. L. Rapson.
Gas containers for motor vehicles (14,125)—F. A. Wilkinson.
Brakes for motor vehicles (14,535)—E. L. Cornell.
Motor vehicles (14,802)—J. Hanman.
Motor vehicles (14,656)—Humber Limited and S. J. Rodgers.
Control valve for gas bags of motor vehicles (14,843)—J. G. Looker.
Automatic guide light to assist adjustment of tramcar trolley poles (14,511)—R. Mercer.
Hydraulic gears for motor vehicles (14,852)—R. Rutherford.
Paving of tramways (14,763)—W. J. Howard-Smith.
Gas containers for motor vehicles (15,037)—J. H. Barnett.
Gas containers for motor vehicles (15,258)—C. Macintosh and Company and L. Brown.
Coal-gas generating appliances for vehicles propelled by internal combustion engines (14,952)—H. Etchells and H. A. Greaves.
Collapsible gas containers for motor vehicles (15,029)—J. Knape.
Trailer vehicles (14,891)—C. McMullen.
Electro-magnetic friction clutches for driving and change-speed gear for motor vehicles (14,908)—Menco-Elma Syndicate and G. Pollard.
Means for carrying gas upon motor vehicles (14,874 and 15,256)—A. Phillips.
Motor vehicles (15,190)—P. S. Swan.
Radiators of motor vehicles (15,154)—T. Totman.
Gas containers for motor vehicles (15,259)—C. O. Uner.
Means for carburetting or vaporising fuel in internal combustion engines for road vehicles (15,180)—R. P. Walker.
Railway chairs (15,687)—J. Archbold and R. Hutchinson.
Automobile road car (15,337)—B. Averkieff.
Brake and clutch mechanism of locomotives, railway motor cars, etc. (15,500)—Baguley Cars, Limited, and L. Bentall.
Power transmission mechanism of locomotives, railway motor cars, etc. (15,501)—Baguley Cars, Limited, E. E. Baguley and L. Benthall.
Electric trams propelled by overhead wire (15,369)—R. D. Bailey.
Differential gearing for steering motor vehicles (15,303)—G. M. Blackwood, E. Carter, F. Carter, and R. E. Watts.
Trailers for self-propelled road vehicles (15,362)—G. Enderby.
Motor vehicles (15,597)—T. de Estrada.
Combined driving and steering device for motor vehicles (15,410)—H. G. C. Fairweather (*Leffler*).
Signalling systems for railways (15,317)—J. Hardman.
Receptacles for gas under pressure for motor vehicles (15,437)—J. W. Harper.
Radiators of motor vehicles (15,292)—J. Hodgson.
Gas containers for motor vehicles (15,286)—B. Shaw.
Flexible gas containers for motor vehicles (15,390)—A. E. Short and H. O. Short.
Device for stopping runaway tramcars (15,313)—W. A. Staton.
Motor vehicles (15,991)—A. Dunhill.
Air and gas mixer for running motor car petrol engines on gas (15,859)—T. P. Dunkerley.
Light railway locomotives (15,878)—F. H. Dutton.
Collapsible gas containers for motor vehicles (16,041)—G. H. Dutton and J. Knape.
Vacuum brake gear for railway rolling stock (15,906)—W. C. Echlin.
Railway or tram lines (15,800)—K. E. Hall.
Traffic indicator for motor vehicles (15,912)—H. Heron.
Continuous railway brake apparatus (15,831)—H. F. Ward.
Gas containers for motor vehicles (15,869)—G. W. Williams.

Specifications Published.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application number should, however, still be used for correspondence purposes.

Vehicles for combined road and rail traction (12,975—*109,313*)—W. F. Holt.

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Electric signalling systems (13,746—*109,325*)—R. Lambourne.
Fare ticket devices for omnibuses and tramways (13,376—*109,491*)—W. Aitken.
Motor vehicles (16,020—*109,529*)—Daimler Co. & F. W. Lanchester.
Appliance for taking moulds of rails *in situ* (18,502—*109,554*)—A. Woodhill.
Car door fasteners (8,880—*109,630*)—G. E. Merritt.
Fuel supply for motor vehicles (13,864—*109,669*)—T. A. and T. H. Barton.
Live axles of motor cars (16,373—*102,489*)—Soc. C. Blum et Cie.
Differential bevel gearing for use in electro-mechanical variable speed mechanism (9,172—*109,816*)—J. G. P. Thomas and Thomas Transmission, Limited.
Means for the propulsion of motor vehicles (11,216—*109,821*)—H. E. Freakley.
Railway permanent way chair (14,905—*109,859*)—E. Webb.
Steering mechanism for motor vehicles (18,346—*103,117*)—National Manufacturing Company.
Electric lighting and heating of railway vehicles (10,855—*109,985*—C. H. Vidal.
Motor vehicles (11,756—*109,986*)—F. W. Gunton.
Train controlling apparatus (14,108 and 14,109—*110,016* and *110,017*)—A. F. Bound and W. Rowland.
Speed-changing, reversing and braking gearing (14,117—*110,020*)—G. Pollard and Menco-Elma Syndicate.
Motor vehicles (16,713—*110,051*)—G. M. and H. F. Caufeild.

1917.

Motor road vehicle bodies (109—*109,371*)—S. G. Jacobs.
Wheels for motor road vehicles (3,649—*109,580*)—F. E. Baker.
Front-driven motor vehicles (9—*109,720*)—A. W. Brightmore.
Transmission gear for motor vehicles (55—*109,721*)—E. A. Jern.
Automatic slack adjusters for railway brakes (6,982—*109,045*)—A. R. K. Djurson.

AN ENCOURAGING OUTLOOK.

Sir Robert Hadfield, chairman of Hadfields, Ltd., Sheffield, holds encouraging views regarding the British steel and other industries, high wages and short hours of labour. Since the war, he says, there have been industrial developments in Britain, France, and Italy that had been regarded as impossible. Industrial England when the war ends will produce 50 per cent. more than when the conflict began, despite the absence of many workers whom the war will have destroyed. On the question of wages and hours, Sir Robert informed a representative of the *Observer*: "We find that shorter hours make good men better and bring the medium workman up to something higher than the old-time average. The war has raised British wages more than it has increased the British cost of living. So, with the shorter hours and better wages, England, with all her fit men eliminated from her industrial machine, is doing the best and biggest work of her life, because she is treating workers better than they have ever been treated in the past.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1916. WEEKS ENDED. Oct. 7.	Oct. 14.	Oct. 21.	Oct. 28.		1917. WEEKS ENDED. Oct. 6.	Oct. 13.	Oct. 20.	Oct. 27.		AGGREGATE. Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	54.067	53.349	53.160	52.134	...	55.070	53.666	53.113	53.732	...	43	2.218.241	+ 27.698
Auckland	...	(28 days)	21.428	...	...	...	(28 days)	22.308	...	...	17	92.118	+ 7.832
Calcutta ... ... Rs.	77.886	65.344	65.045	63.346	...	68.907	72.288	71.493	63.364	...	43	2,938.287	+ 26.810
Madras	...	...	(2 weeks)	31.819	...	...	...	(2 weeks)	35,418	...	43	696.215	+ 32.305
Pernambuco	3.269	3.216	3.216	3.166	...	4.366	4.279	4,259	4.194	...	42	163.170	+ 32.635

Companies Issuing Monthly Statements.

	1916. May.	June.	July.	August.	Sept.	October.	1917. May.	June.	July.	August.	Sept.	October.	Wks.	AGGREGATE. 1917.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	3.854	2.794	2.704	...	...	...	2.991	2.849	2.593	...	...	...	16	13.044	− 35
Brazilian Traction Mlrs	7304000	7178000	7429000	7405000	7138000	...	7864000	7642000	7795000	8064000	7925000	...	39	68.430.000	+5.279.000
Brisbane	33.150	31.390	32.880	37.900	32.530	...	33.340	32.475	32.720	36.925	31,600	...	39	294.840	− 2.820
British Columbia ...	$ 414.215	400.814	411.847	423,738	414.811	...	438.919	373.029	438.378	454,425	457.709	...	13	1.350.512	+ 100,116
Buenos Ayres Lacroze	40.220	36.213	38.439	36.431	37.077	39.670	40.595	38.020	38.063	39,111	33.655	39.067	17	149.879	− 1.737
Burma	23,585	24,027	26.340	24.413	23,749	...	24.906	25,463	26.288	26.714	26.168	...	8	52.882	+ 4.720
Cape Town	...	...	...	13.394	...	...	15.867	...	16.067	15.480	...	...	8	31,547	+ 4.796
Carthagena & Herrerias	2.927	3.512	2.371	2.081	1.779	2.539	4.321	5.325	5.763	4.164	4.306	2,805	43	41.210	+ 16.071
Cordoba	14.869	14.120	14.258	13.851	13.313	...	13,735	14.416	14,343	14.278	12.463	...	26	82.895	− 1.588
East India	2.161	2.283	2.220	2.522	2.523	2.080	1,455	1,186	1,183	1,562	1,512	1,229	13	4.303	− 2.822
Kalgoorlie	2.921	2,500	2.521	...	...	...	2,692	2,648	2.713	...	...	...	30	18.154	+ 696
La Plata	4,342	3,735	3.910	3.793	3.993	4,434	4.126	3,852	3.875	4.076	3.450	4.069	43	40.615	− 1.441
Lima	33.966	...	...	...	33.340	...	35.321	...	...	...	35.621	...	39	322.195	+ 18.107
Manaos ... ... Rs.	152.854	144.913	152.380	...	...	...	158,613	165,693	162.157	...	...	...	—	—	—
Manila ... ... $	53,900	59.432	...	...	...	...	61.500	73,900	...	...	...	...	—	—	—
Mexico ... ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	28.349	25.300	25.220	26.044	26.711	...	28.716	27.458	28.597	28.860	29.426	...	48	329.679	+ 10.636
Peruvian	$ 826.900	929.500	835.430	895.900	911.910	945,590	902.780	965,420	975.000	979.430	950.740	1047220	17	3,952.390	+ 363.560
Port Elizabeth	...	...	3.166	2.863	...	...	3.494	...	3.544	3.360	...	...	8	6.904	+ 875
Rangoon	4.589	4.205	4.357	4.253	4.137	5.043	4.737	4.383	4.783	4.788	5.163	5.667	43	50.021	+ 3.650
Toronto	$ 903.924	884.491	867.789	889.241	913.535	...	992.460	984.529	954.192	1039819	1023517	...	39	8.891.112	+ 885.348
Winnipeg	$ 276.980	254.686	242.688	249,795	267,497	...	259.794	254.226	242.797	248,457	267.170	...	39	2.431.794	− 29.660

(*Continued on page 344*)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1916. WEEKS ENDED.					1917. WEEKS ENDED.					AGGREGATE.		
	Oct. 7.	Oct. 14.	Oct. 21.	Oct. 28.		Oct. 6.	Oct. 13.	Oct. 20.	Oct. 27.		Wks.	1917.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Aberdare U.D. Council	442	430	395	407		437	434	467	418		29	12,965	+ 1,107
Aberdeen Corporation	1,912	1,880	1,768	1,771		2,084	2,040	2,030	1,955		21	46,298	+ 5,209
Accrington Corporation	*										—	—	—
Ayr Corporation	331	300	283	278		504	338	338	327		24	13,138	+ 1,233
Bath Electric	*										—	—	—
Belfast City	6,147	5,950	5,755	5,756		6,999	6,848	6,788	6,985		30	190,969	+ 19,786
Birkenhead Corporation	1,596	1,598	1,585	1,547		1,724	1,777	1,811	1,793		30½	55,577	+ 8,270
Birmingham Corporation	17,079	14,725	14,766	15,133		19,634	18,837	19,149	19,037		30	547,156	+ 51,131
Birmingham Corp. Motor Omnibuses	960	1,058	991	963		1,248	1,106	1,174	1,185		30	30,932	+ 622
Blackburn Corporation	1,221	1,123	1,157	1,158		1,549	1,387	1,387	1,358		30⅝	46,518	+ 6,929
Blackpool and Fleetwood	...	566	442	379		...	675	526	418		42	40,260	+ 211
Blackpool Corporation	*										—	—	—
Bolton Corporation	*										—	—	—
Bournemouth Corporation	2,223	2,118	2,033	2,050		2,483	2,396	2,455	2,418		30½	81,400	+ 6,106
Bradford Corporation	6,492	6,928	6,587	6,358		7,902	7,094	9,084	7,331		30	234,075	+ 23,137
Brighton Corporation	*										—	—	—
Bristol	5,217	5,085	5,014	4,830		6,269	5,645	5,729	4,034		43	233,041	+ 20,935
Burnley Corporation	1,797	1,677	1,707	1,594		2,099	1,837	1,838	1,810		—	—	—
Burton-on-Trent Corporation	321	310	278	285		341	325	315	319		30	9,346	+ 841
Bury Corporation	1,408	1,410	1,372	1,274		1,656	1,580	1,566	1,482		30⅞	51,124	+ 6,112
Cardiff Corporation	*										—	—	—
Chatham and District	1,353	1,343	1,316	1,212		1,050	1,176	1,210	1,113		43	55,420	+ 2,011
Chesterfield Corporation	*										—	—	—
Colne Corporation	*										—	—	—
Cork Electric	540	567	544	494		632	577	567	566		43	23,704	+ 1,575
Croydon Corporation	*										—	—	—
Derby Corporation	1,190	1,180	1,148	1,115		1,279	1,222	1,210	1,253		30	36,633	+ 1,490
Dover Corporation	*										—	—	—
Dublin and Lucan	*										—	—	—
Dublin United	7,058	6,549	6,341	6,165		7,512	6,777	6,800	6,846		43	288,749	+ 27,363
Dundee City	1,439	1,394	1,347	1,355		1,641	1,505	1,507	1,488		23½	36,334	+ 3,343
East Ham Corporation	1,299	1,298	1,314	1,244		1,263	1,308	1,329	1,262		30	42,732	+ 2,569
Exeter Corporation	431	427	394	377		433	396	386	379		30	12,455	− 67
Gearless Motor 'Buses	*										—	—	—
Glasgow Corporation	24,296	23,899	24,246	23,936		27,295	26,341	26,939	26,185		21⅜	564,924	+ 64,389
Glossop (Urban Elec. Supply Co.)	146	146	140	146		177	171	166	168		43	6,596	+ 600
Halifax Corporation	2,224	2,044	2,098	2,097		2,587	2,273	2,309	2,311		29⅜	75,443	+ 6,037
Halifax Corp. Motor Omnibuses	52	49	51	49		54	51	53	48		29⅜	1,446	− 61
Hastings and District	1,076	960	936	836		1,304	1,200	1,155	1,124		43	54,486	+ 8,363
Huddersfield Corporation	2,791	2,790	2,776	2,661		3,376	2,996	3,173	3,032		30	99,980	+ 9,385
Hull Corporation	...	...	...	...		...	...	...	...		—	—	—
Ilford U.D. Council	669	678	642	626		678	713	728	694		30	23,391	+ 2,356
Ilkeston Corporation	*										—	—	—
Ipswich Corporation	477	476	441	442		700	665	658	635		30	21,398	+ 4,871
Isle of Thanet	338	336	292	258		181	195	206	157		4	713	− 511
Kilmarnock Corporation	180	174	176	177		200	200	206	203		23½	4,681	+ 427
Lanarkshire	2,485	2,416	2,289	2,449		2,974	2,883	2,980	2,958		43	118,913	+ 18,997
Lancashire United	2,361	1,884	1,861	1,873		2,688	2,354	2,483	2,411		43	100,858	+ 21,990
Leeds City	9,902	9,909	9,692	9,585		11,428	10,521	11,023	10,783		30	333,846	+ 33,843
Leicester Corporation	3,536	...	3,423	3,411		4,068	...	3,841	3,849		—	—	—
Leith Corporation	886	867	858	842		1,089	1,024	1,049	1,017		23½	25,785	+ 4,546
Leyton U.D. Council	1,652	1,557	1,538	1,449		1,696	1,694	1,814	1,728		30	57,380	+ 5,964
Liverpool Corporation	14,619	14,943	14,479	14,265		16,843	16,212	15,917	15,925		42⅝	666,435	+ 59,746
Llandudno and Colwyn Bay	327	317	284	255		370	321	290	271		47½	16,855	− 902
London County Council	50,215	49,436	48,920	47,016		52,498	52,549	55,381	53,836		29¼	1,651,816	+204,437
London General Omnibus	*										—	—	—
London United	*										—	—	—
Lowestoft Corporation	*										—	—	—
Maidstone Corporation	280	221	217	197		300	222	229	215		30	7,532	+ 690
Manchester Corporation	19,169	19,216	18,648	18,678		21,882	20,475	21,002	20,794		30	621,480	+ 48,128
Metropolitan Electric Tramways	*										—	—	—
National Steam Car	*										—	—	—
Nelson Corporation	201	196	197	214		244	219	219	221		30	7,147	+ 538
Newcastle-on-Tyne Corporation	7,123	7,150	7,045	6,985		8,156	7,884	8,069	7,988		30	235,707	+ 33,635
Newport (Mon.) Corporation	*										—	—	—
New St. Helens and District	1,170	1,075	1,041	1,085		1,427	1,224	1,266	1,249		17	26,249	+ 6,713
Northampton Corporation	732	721	723	714		898	820	836	865		30	25,239	+ 3,561
Nottingham Corporation	4,064	4,077	4,041	3,939		4,711	4,546	4,639	4,445		30	132,282	+ 12,774
Oldham Corporation	2,313	2,468	2,382	2,214		2,839	2,840	2,690	2,650		31	88,854	+ 10,146
Portsmouth Corporation	2,745	2,686	2,526	2,465		3,041	2,599	2,730	2,581		—	—	—
Preston Corporation	*										—	—	—
Provincial	2,281	2,373	2,251	2,134		2,680	2,267	2,344	2,335		3½	9,138	+ 507
Reading Corporation	930	930	891	859		1,222	1,120	1,088	1,086		30½	31,716	+ 5,670
Rhondda Tramways	1,419	1,383	1,375	1,375		1,659	1,557	1,656	1,577		43	64,391	+ 9,025
Rochdale Corporation	*										—	—	—
Rotherham Corporation	1,652	1,590	1,618	1,588		1,801	1,859	1,814	1,837		30½	55,119	+ 7,272
Salford Corporation	5,488	5,413	5,420	5,231		6,421	6,515	6,536	6,311		30⅝	201,421	+ 32,109
Sheffield Corporation	10,471	10,709	10,656	10,489		12,211	12,218	11,921	12,199		31	371,561	+ 43,026
Southampton Corporation	1,820	1,771	1,726	1,623		2,323	2,143	2,269	2,144		29⅜	61,099	+ 10,172
Southend-on-Sea Corporation	929	833	786	685		622	592	645	622		30	30,115	− 803
South Metropolitan Tramways	*										—	—	—
South Shields Corporation	861	854	...	...		965	926	...	...		15	27,042	+ 3,009
Sunderland Corporation	1,655	1,668	1,630	1,625		1,820	1,873	1,831	1,830		51	36,869	+ 5,145
Sunderland District	656	889	726	...		811	903	854	...		—	—	—
Swindon Corporation	222	209	205	199		296	265	266	258		29¼	8,188	+ 1,973
Torquay Tramways	648	596	549	519		823	753	684	691		43	28,762	+ 2,499
Tramways (M.E.T.) Omnibus Co.	*										—	—	—
Tyneside Tramways and Tramroads	636	639	633	610		912	780	825	787		17	11,858	+ 3,875
Wallasey Corporation	1,299	1,320	1,243	1,221		1,594	1,469	1,454	1,420		30½	49,286	+ 5,755
Walsall Corporation	841	842	823	822		1,036	1,002	1,022	990		30	29,447	+ 3,823
Walthamstow U.D. Council	1,076	1,073	1,033	993		1,088	1,075	1,111	1,068		30	38,141	+ 3,786
Warrington Corporation	463	514	530	509		592	580	567	570		30	16,209	+ 1,313
West Ham Corporation	3,395	3,287	3,271	3,091		3,252	3,359	3,611	3,412		29⅜	110,348	+ 11,668
Wigan Corporation	1,775	1,724	1,736	1,726		2,072	2,000	2,114	2,310		30	59,409	+ 8,366
Wolverhampton Corporation	*										—	—	—
Yorkshire (West Riding)	1,834	1,803	1,757	1,672		2,106	2,105	2,126	2,240		43	91,143	+ 15,361

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

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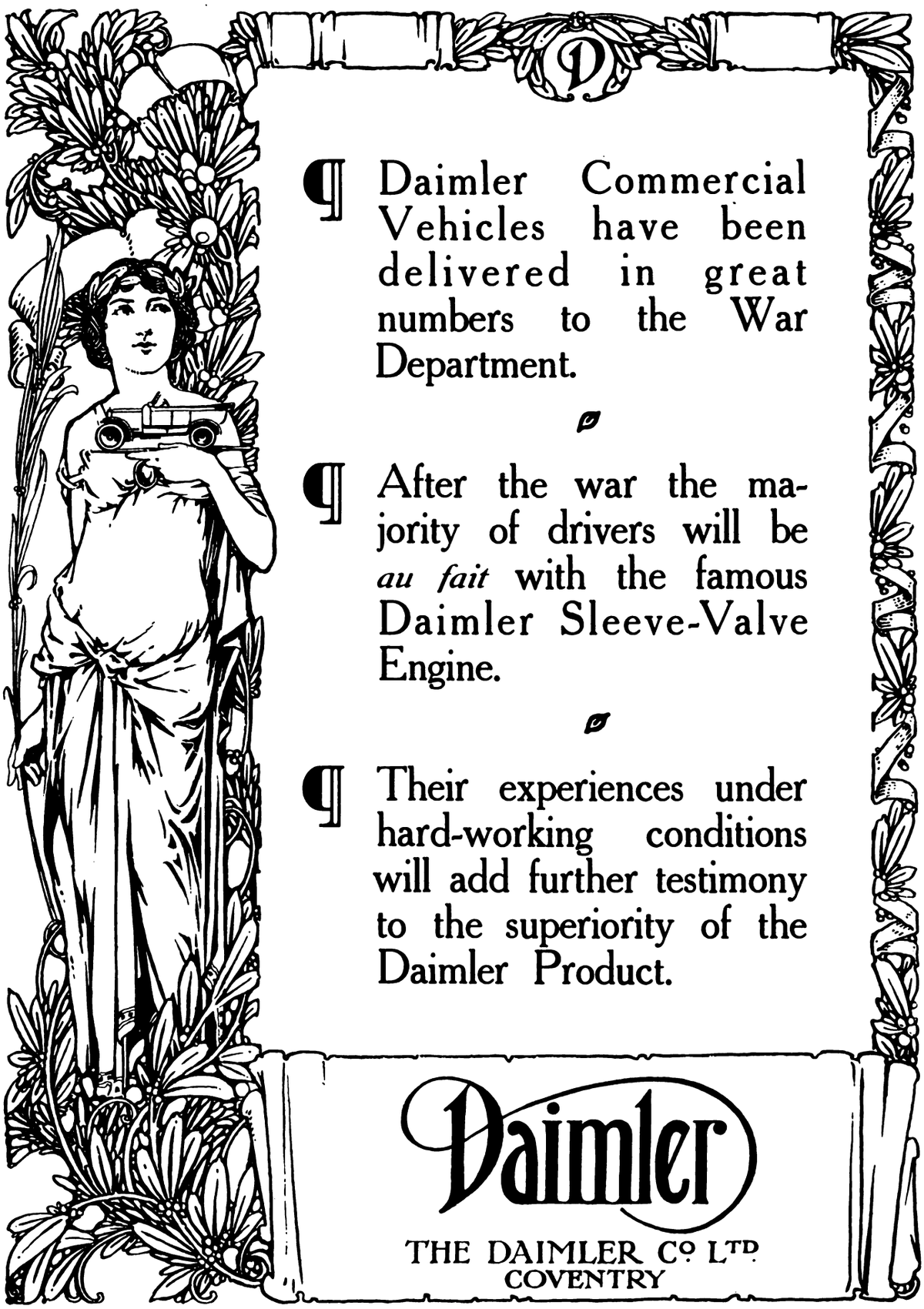

¶ Daimler Commercial Vehicles have been delivered in great numbers to the War Department.

¶ After the war the majority of drivers will be *au fait* with the famous Daimler Sleeve-Valve Engine.

¶ Their experiences under hard-working conditions will add further testimony to the superiority of the Daimler Product.

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THE DAIMLER Co LTD
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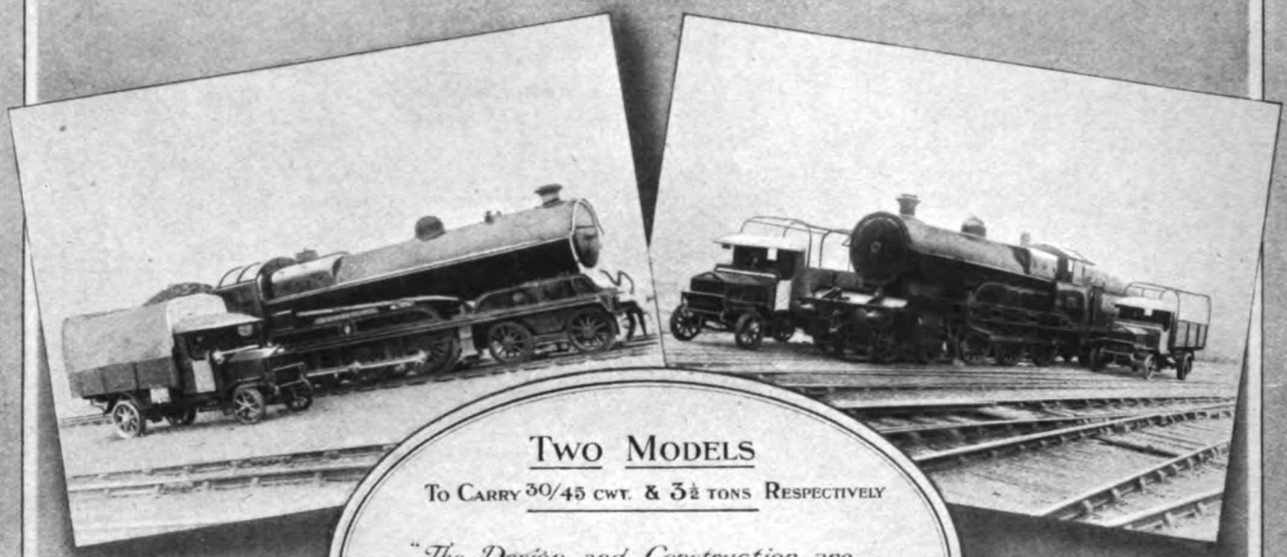
NAPIER

MOTOR VEHICLES.



TWO MODELS

To Carry 30/45 cwt. & 3½ tons Respectively

"The Design and Construction are Throughout of a Character, which it would be Exceedingly Difficult, if not Impossible, to Improve Upon."

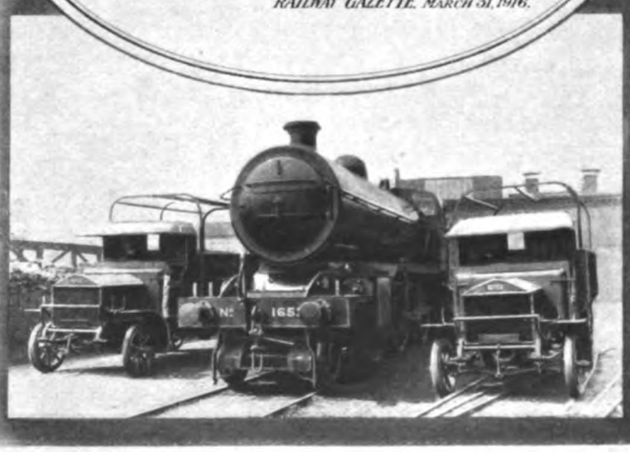
RAILWAY GAZETTE, March 31, 1916.

IN PEACE

USED BY THE LARGEST CARRYING COMPANIES AND COMMERCIAL HOUSES.

IN WAR

USED BY THE BRITISH AND ALLIED GOVERNMENTS.



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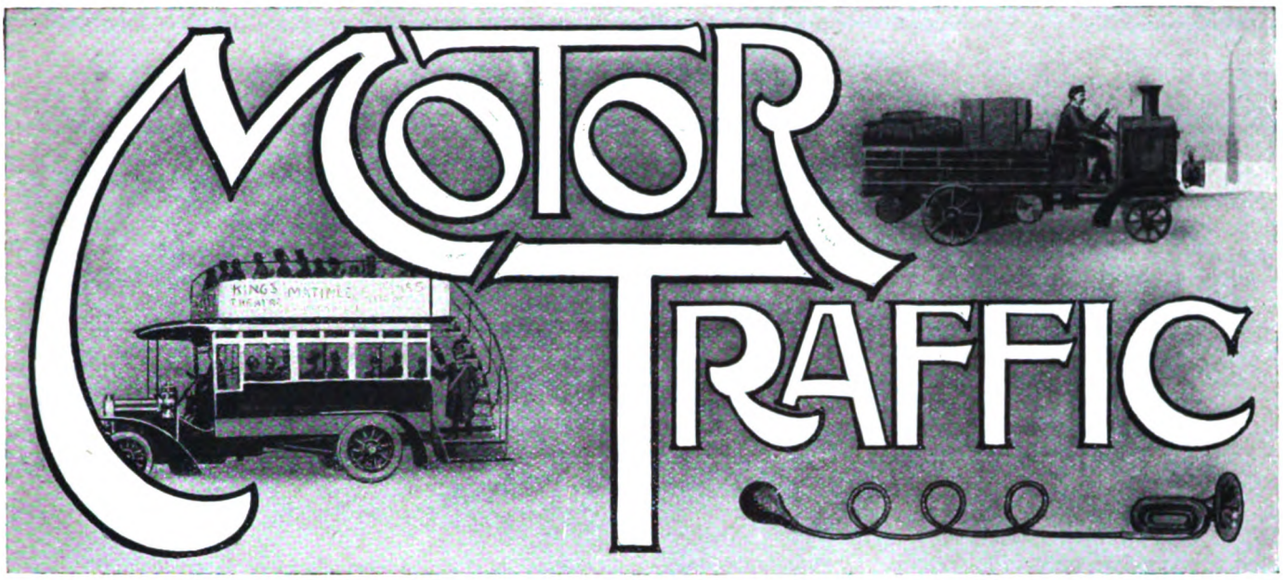

The extension of the use of coal gas as a motor fuel proceeds apace. The first demonstration of vehicles equipped with the necessary fittings for this purpose, which was recently held in London, proved a great success. Although the exhibits, over forty in number, did not reveal any striking novelties, they showed considerable improvement in details. The gas bag can never be a thing of beauty, but undoubtedly its appearance is already far less untidy. The D-shaped bags are much neater than the round ones. The trend is in the direction also of semi-rigid containers and of containers of the concertina type. These improved forms get over the troubles consequent upon the sagging of the original shape of gas bag over the sides of the planking or framework holding it more or less in position. Neater methods of securing the bags have been devised, and there are also several small improvements in the fittings and connections through which the gas passes from the bag to the engine. One new device gets over the possibility of overcharging the gas bag by means of an automatic valve which closes when the bag is filled to the proper extent. Other improvements aim at making the whole installation a more workmanlike job and at preventing the bonnet from being used as a sort of gasometer.

* * * * * *

A development which will be watched with considerable interest is the adoption of the idea of carrying the gas bag upon a trailer. This is simple enough from the mechanical point of view. The main trouble to be anticipated is with the law. A heavy motor vehicle may not draw a trailer at anything above five miles an hour. A motor car, not sufficiently weighty to bring it under the Heavy Motor Car Order, is privileged to draw a trailer which does not weigh more than 2 cwts. unladen without detriment to its legal speed limit, provided that it is possible to reverse with the trailer attached. This provision is met by the gas-carrying trailers now marketed, so that in connection with the lighter classes of vehicle these may prove extremely useful, even though they cannot claim to be particularly elegant. Naturally, reversing is not so simple with the trailer as without it. It is, however, not impossible, and from the point of view of ordinary manœuvring, the trailer does not constitute a very grave inconvenience. The question of whether a similar device will be eligible for use as a carrier of compressed gas cylinders depends entirely on whether the weight of such cylinders is to be regarded legally as part of the weight of the trailer or as part of the load placed upon it. If the former, then the two-hundredweight limit must be exceeded, but if the latter the trailer will afford a quite adequate method of carrying considerable supplies of coal gas fuel in a compressed form. One of the advantages of the trailer as against the gas bag mounted upon the vehicle roof is that the former gets over any difficulty that the latter may engender in the matter of passing through garage doors of limited height. At least one scheme has been brought out with a view to meeting this difficulty in the case of what we may call the ordinary type of coal gas equipment. A subsidiary gas bag, generally empty, is carried either below the roof or against the back of the vehicle, and the gas from the bag on the roof can be passed through into the subsidiary bag when necessary. There is already some talk of the use of coal gas as a fuel for agricultural motors. Certainly, if a huge number of these are to be entirely dependent on petrol, the prospects of dealing with the required acreage before next sowing appear to be somewhat complicated.

* * * * * *

Discussion is in progress as to the advisability of making a milometer a standard fitting of every commercial motor vehicle. The idea is partly to enable the user to keep accurate records of performance and to exert some check upon drivers. It is partly suggested with a view to protecting tyre manufacturers who give mileage guarantees against incorrect estimates of mileage. The main difficulty is to devise a milometer which, while sufficiently accurate, is also sufficiently immune from any form of tampering. So long as it is possible for a driver to play about with a milometer in order, say, to give an unduly high impression of the fuel economy of the vehicle under his charge, it follows that users will be misled as to actual results, and, in turn, will unintentionally mislead tyre manufacturers. Assuming an honest driver, or some means of ensuring that the instrument is left to do its own work without unintentional interference, a milometer is a very useful fitting, the trifling cost of which is well justified. Without it there are almost insuperable difficulties in endeavouring to compare accurately the results obtained by various vehicles of a fleet. Probably, if any standard type be adopted, it will be of a kind that is worked from the gear box without any flexible form of transmission. The question is whether users are sufficiently interested in the matter to give that definite encouragement without which vehicle manufacturers are unlikely to make the milometer a standard fitting.

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MOTOR TRAFFIC.

With the coming of coal gas, new possibilities are opened up in the way of the establishment of complete charging stations for motor vehicles of all kinds. The principle of the prepayment meter can be used in connection with supplies of gas, electricity, petrol, water, and so on, and it is likely that up-to-date garages will find it worth while to erect installations which will have the effect of making them regular calling places, and therefore of inducing business of other kinds. The police authorities appear to be watching this possibility in a slightly hostile manner. They fear that charging stations may be equipped which will lead to large numbers of vehicles standing in the public roads to take in supplies, and causing obstruction by so doing. This point of view does not appear to be justifiable, since even now time is occupied in filling up, for example, a petrol tank. The adoption of new and improved methods would not increase but would reduce time so spent, and so tend to eliminate rather than exaggerate any obstruction resulting from such a cause. Undoubtedly, the time will come when completely equipped charging stations of the kind indicated will be available at suitable intervals along all our principal roads. The question is whether they will be the result of the private enterprise of garage proprietors, or whether municipal authorities will themselves be long-sighted enough to provide for a growing need in connection with which a reasonable profit can be safely anticipated.

* * * * * *

Hitherto, it has not been possible for the motor user to get any very clear idea of the constituents of the spirit commonly supplied to him, or to judge whether other spirits marketed under different names are in fact pretty much the same as the one he generally favours. As a rule, all that we know about a petrol is the name the importers choose to give it and perhaps its specific gravity. This latter conveys very little real information. If motor spirit consisted of only one hydrocarbon, then, if we knew the specific gravity, we should know all the rest. It is, however, invariably a mixture of a number of hydrocarbons, and it follows that the specific gravity is nothing more than a sort of rough indication of the average of its constituents. Two spirits of the same gravity might be very different in actual quality and efficiency. A suggestion has recently been put before the Institution of Petroleum Technologists to the effect that petrol should be marketed in standard qualities, the standards being determined by suitable tests, not of gravity, but of volatility. If we know at what temperature the lightest fraction will boil, the percentages of the spirit which distil at certain other selected temperatures, and the final boiling point, we can tell pretty well what are the constituents of the spirit. If this suggestion of standard grades could be put into practice we should in all cases have such information. If we could not get our accustomed spirit, we could probably get another of the same grade, and we should know that it would behave in much the same way and give much the same mileage. The innovation would, in fact, be a convenience to motor users, and therefore it is to be hoped that scientists will see their way to agree on the necessary preliminary of standard tests, and will then be able to come into agreement with the other interests concerned as to the number and nature of the grades of spirit that ought to be standardised.

The war has added greatly to the urgency of the problem of the roads in relation to modern traffic, for in many instances the absorption of labour for military purposes renders it a difficult matter to give main roads the minimum of attention. These circumstances, however, cannot be accounted sufficient reason for neglecting the whole question, which will have to be dealt with when happier times arrive. With a view to lightening the wear on the roads, a committee was appointed just before the war to report upon the revision of axle weights, etc., of motor vehicles, but for some reason not disclosed, their report, if presented, is withheld. Traffic has increased enormously in various localities owing to war work, and from places in the neighbourhood of national factories and of military centres demands have been made upon the War Office to meet extraordinary traffic claims. These claims have saved the Road Board from the extinction, for the duration of the war, with which it was unwisely threatened. It has been deputed to deal with these claims and has also supervised the execution of repairs and met the cost. Just prior to the outbreak of the conflict it was agreed by the House of Commons that a committee should be given the task of considering the question of road charges to be paid by heavy motor conveyances, but the investigation does not seem to have been taken up. Towards the end of last year the position was complicated by the passing of the temporary Act authorising a charge to be levied on omnibus owners who desire to use new routes. The result has been that numerous authorities have sought to levy exorbitant charges, a procedure that has stiffened the resolve of the owners to see that the measure is not perpetuated.

AWARD TO LONDON TRACTION WORKERS.

The Committee on Production have awarded the following weekly increases to London General Omnibus workers : —Drivers and conductors, 4s., inside adult staff, 4s. This award is in addition to the 5s. a week granted to drivers and conductors and the 4s. granted to garage staffs last June. The war wages advances now being paid to engineering labourers working with skilled craftsmen are increaesd to 15s. a week. The following weekly advances have been granted in respect of employees of the Metropolitan, the London United, and the South Metropolitan Tramways :—Men, 4s. ; boys and youths under 18 years of age, 2s. In the case of engineering labourers working with skilled craftsmen, the war wages advances now being paid are increased to 15s. per week. The increases are in addition to the advances granted last May. The amounts awarded in each case are to be regarded as " war wages and recognised as due to and dependent on the existence of the abnormal conditions now prevailing in consequence of the war."

THE USE OF PRIVATE CARS.

On October 31 the President of the Board of Trade issued an order under which private motor cars can be used for business purposes, public duties, journeys to and from a railway station, and in connection with necessary household affairs, provided that no other means of conveyance is reasonably available.

BREAKING UP CARS FOR WAR MATERIALS.

The Ministry of Munitions are licensing various firms to purchase cars, especially those of the older types, in order to break them up to recover the aluminium, bronze, brass and steel. These materials are sent in to the official smelters to be made into war material. Aluminium is especially needed for aircraft. The upholstering is utilised as rags, and the old tires, woodwork, leather, etc., can all be utilised for purposes connected with the war.

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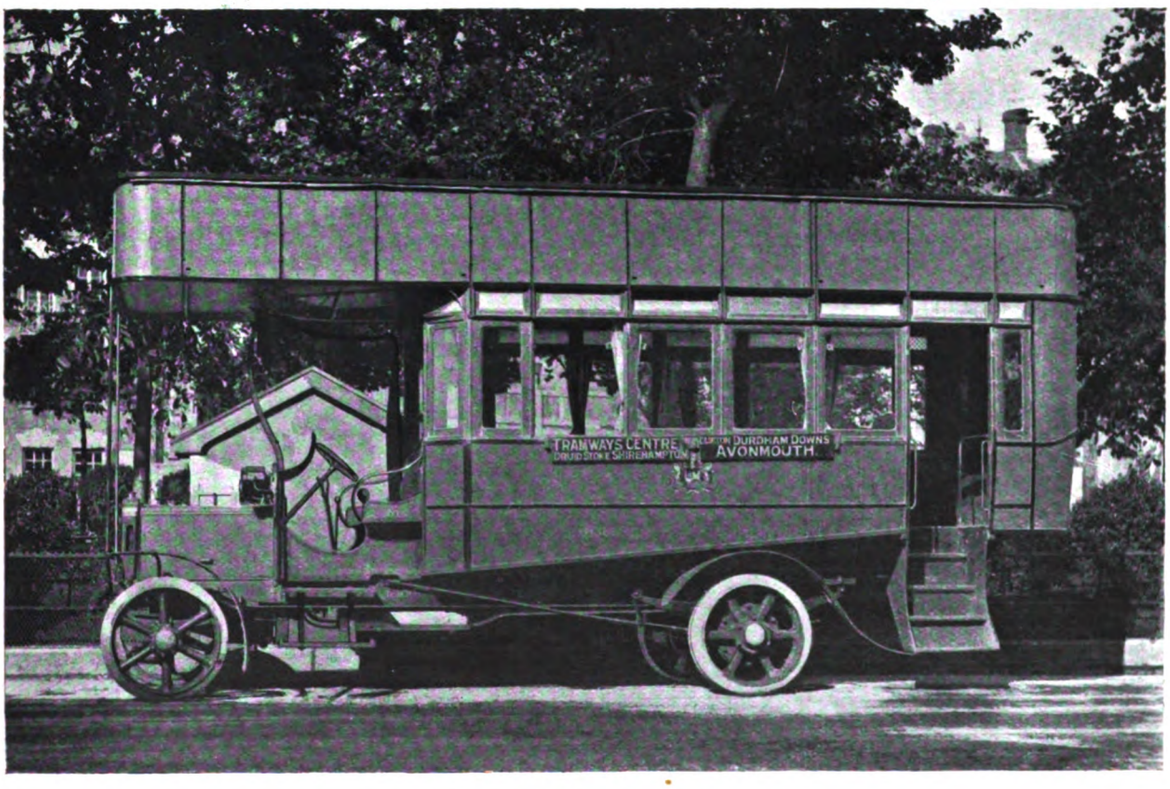
MOTOR TRAFFIC.

Gas Container Fully Charged—Capacity 850 cubic feet.



Gas Container Deflated.

Bristol Tramways and Carriage Company's Motor Omnibus Equipped for Gas Working.

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MOTOR TRAFFIC.

GOVERNMENT AND GAS COMPANIES' ATTITUDE.

The Automobile Association has been in communication with the Ministry of Munitions concerning the use of coal gas, asking for an assurance to the effect that gas may be used without restriction. The Ministry of Munitions has replied that, so long as the gas is conveyed in bags at or slightly above atmospheric pressure, and not compressed in steel cylinders, it is not considered that there is any need for restricting its use. At the same time, if motorists were to use coal gas on any considerable scale, it might, in the interests of national requirements, become necessary to impose restrictions.

In view of the foregoing reply of the Munitions Ministry, it is desirable that the motor owners should ask that the Government departments should co-ordinate their actions. The Ministry's reply is antagonistic to the hope which Mr. Walter Long recently expressed that as soon as possible many thousands of industrial vehicles will be equipped to run on gas power. Mr. Long added that the saving of petrol has a direct effect on the price of food. Mr. Long's observation is the more important because of his recent appointment as head of the Petroleum Executive. In an announcement issued by the Petroleum Executive it is pointed out that one gallon of petrol suffices to carry three tons of food a distance of only eight miles, which emphasises the importance of substituting gas. Furthermore, the executive have appointed a special committee to keep in touch with the gas fuel movement.

The two departments must realise that gas can only be substituted for coal if the Coal Controller can make arrangements for gas companies to be adequately supplied with coal. Already some companies are charging exorbitant prices for gas supplied to motor vehicles. In one instance 2s. 2d. was the charge for 200 cubic feet, although the charge for lighting is 3s. 4d. per 1,000 cubic feet. The first-mentioned charge is the equivalent of petrol at 2s. 0d. per gallon. Numerous companies have adopted the reasonable charge of 3s. per 1,000 cubic feet. The reason advanced for imposing the higher charge is that the companies are unable to secure sufficient coal to meet the additional demand. This reason conflicts with the frequently uttered exhortation to gas consumers to use gas so as to assist in creating the residuals that are now of incomparable importance in the manufacture of munitions. It is to be hoped that the coal difficulty is not the result of the institution of the Coal Controller's department, but judging by the experiences of householders there is ground for entertaining that suspicion.

PROGRESS OF GAS TRACTION.

RAPIDLY EXTENDING USE FOR PUBLIC AND PRIVATE CARS.

ROTHERHAM.—The tramways department have resolved to utilise coal gas containers for their omnibuses.

HALIFAX.—The general manager of the Corporation tramways has been authorised to obtain four gas containers to be fitted to the motor omnibuses run by the department.

WALSALL.—The Tramways Committee have purchased gas containers for four motor omnibuses at £23 8s. each. The order followed the carrying out of a trial run in an omnibus belonging to the Corporation.

LIVERPOOL.—It is stated that the Gas Company are not encouraging developments in gas traction owing to the difficulty of obtaining labour to increase the output of gas. The company will not let out meters on hire, and will only sell at a price which is said to be prohibitive except to large garages. It is further asserted that the company state that their legal powers do not permit the supplying of gas for re-selling. Therefore garage owners having a meter can supply only their own vehicles and not those of their customers.

LONDON.—It is satisfactory to find that at least two Government departments, besides numerous private traders, are seeking to obviate the petrol shortage by introducing gas traction. The Royal Naval Air Service and the Navy and Army Canteen Board are running several of their numerous vehicles so fitted. Among the business houses included in the same category are Harrod, Maple, Barker, Whiteley, Lyons, and J. I. Thornycroft, the motor vehicle manufacturers.

LEWISHAM.—The Works and Highways Committee of the Borough Council have recommended acceptance of an offer by Messrs. Lyon, Limited, to supply and fit the Lyon-Spencer gas installation with the necessary fittings and tray, to the surveyor's car at an estimated cost of £43 3s. 6d. At present the surveyor has a licence which enables him to purchase 20 gallons of petrol per month, half of that amount being supplied on the recommendation of the Road Board. This quantity is insufficient, and upon application being made to the Road Board in respect to a further supply, the secretary directed attention to the experiments which have been made for the utilisation of coal gas. The gas bag to be obtained from Messrs. Lyon will be of 275 cubic feet capacity, and its cost will be £29 13s. 6d., while the tray or carrier will cost £10 10s. The cost of petrol for the past year has been about £60.

MANCHESTER.—As indicated in a recent issue of this journal, the Gas Committee of Manchester Corporation have, through their energetic general manager, prepared a scheme for the standardisation of gas-filling arrangements with automatic meters of 100-light size to be operated by metal tokens. Each token will represent 100 cubic feet of gas at the fixed price of 4d. These meters, which will be fitted with a 20-ft. length of 2-in. rubber-packed flexible metallic tubing, are to be fixed free of charge at garages and other places. The tenant will be allowed a rebate of 10 per cent. on all tokens taken from his meter, the driver to do his own filling and connecting, for which there will be working instructions on each meter. The tokens will be stamped with the name of the issuing company, and be interchangeable on a system of cash or credit notes between the companies concerned.

WAR OPERATIONS OF THE L.G.O. COMPANY.

At the October meeting, which opened the third session of the "Efficiency Meetings" of the London Underground Railways and the London General Omnibus Company Operating Department, there were about 250 members of the control grades present, the chair being occupied by Mr. H. E. Blain, operating manager.

A lecture, "War Time Operations of the London General Omnibus Company, Limited, as seen through the Camera," was delivered by

One Week's Output of Women Conductors from the L.G.O.C. Training School.

Captain A. Rosier, superintendent of employment and training. The lecture was illustrated by slides and films, and proved an exceedingly valuable and interesting record of the Company's operations in connection with the war and at home under the influence of war conditions.

Amongst war pictures were L.G.O.C. single-deck omnibuses equipped as ambulances; with the Naval Division at Antwerp, and Boulogne and in France; conveying regulars, London Scottish, Indians, and wounded; whilst other pictures showed L.G.O.C. lorries practically in all parts of the world, and performing all types of work with the army, especially the A.S.C. This portion of the lecture was accompanied by anecdotes of the type frequently read in the war correspondents' despatches in the earlier days of the war, when so extensive a part in solving the army's transport problem was being performed by London omnibuses and their drivers, who drove as unconcernedly amongst shot and shell as in Piccadilly or the Strand.

The home portion of the lecture included the training of mechanical transport drivers, and concluded with an excellent new film showing women's work both on the omnibuses and in the garages, coach factories, etc., whilst another portion of the film depicted clerical operations at the Grosvenor Road offices. Two inspections of the L.G.O.C. special constabulary, which force is 350 strong, and has a motor ambulance attached to it, were also shown.

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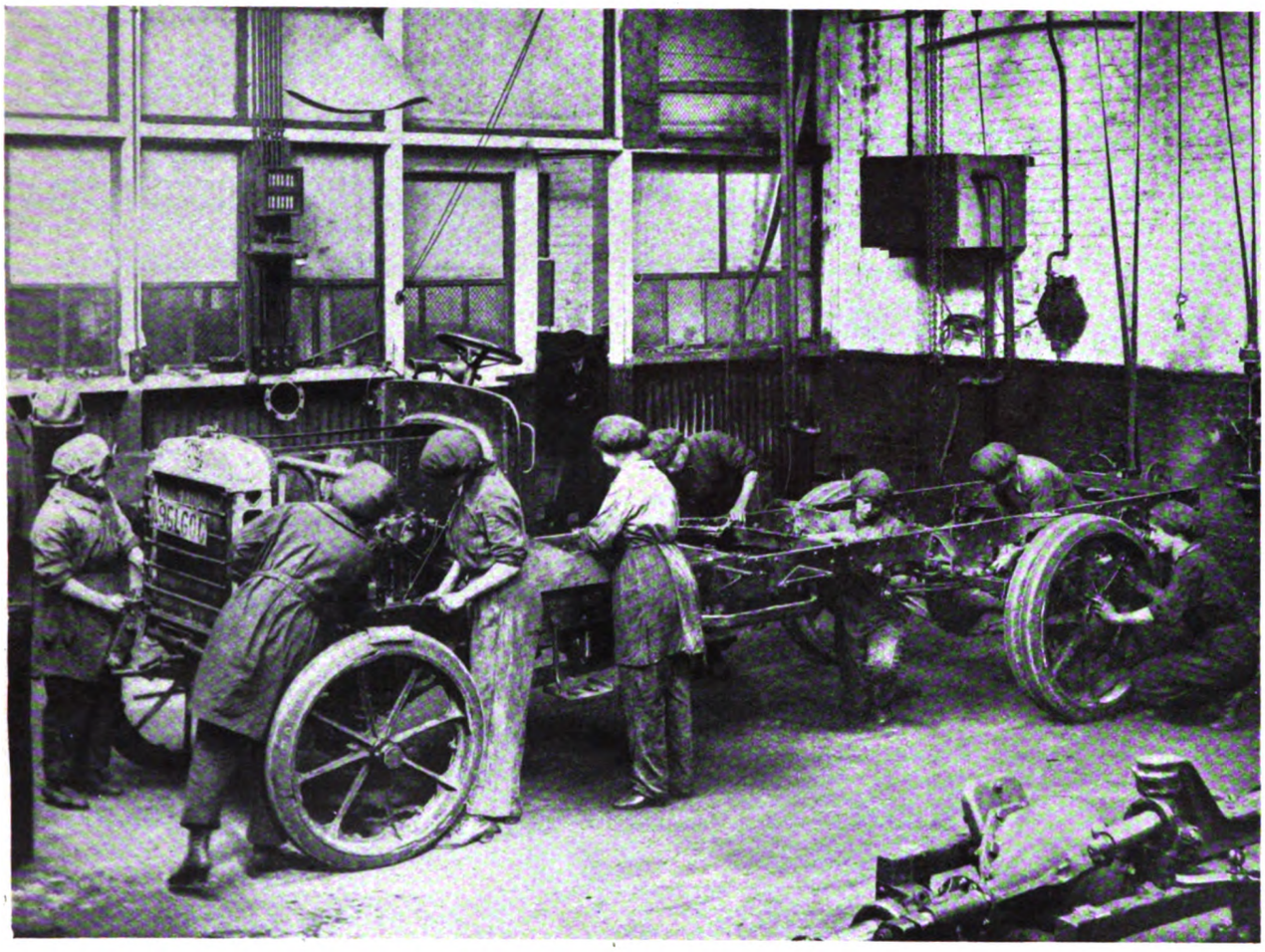
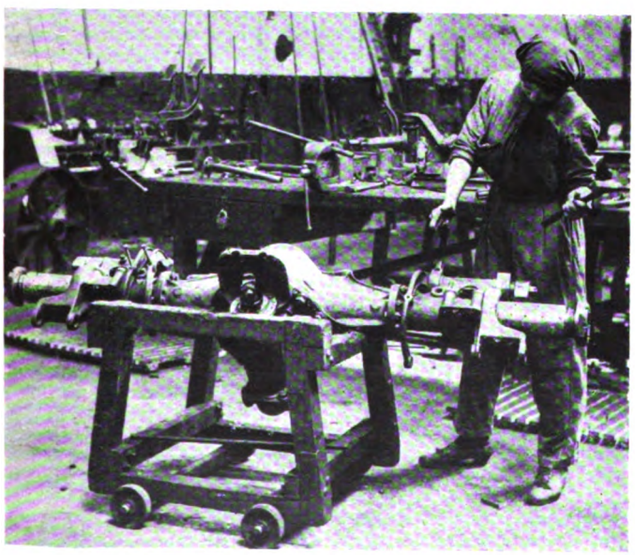
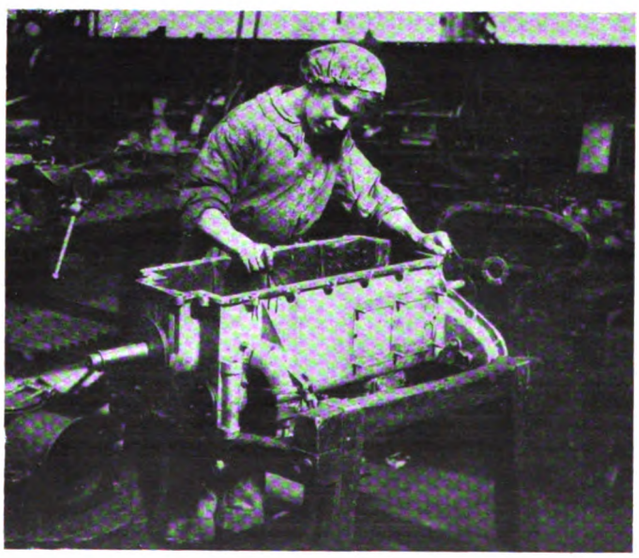
MOTOR TRAFFIC.



Women Workers on Omnibus Chassis.





Women Workers at the London General Omnibus Company's Garages.

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MOTOR TRAFFIC.

SATISFIED USERS OF ELECTRIC VEHICLES.

REPLIES OBTAINED BY WEYMOUTH CORPORATION.

For two years the General Purposes Committee of Weymouth Council have been considering the question of obtaining petrol or steam motor wagons in order to cope with the labour and team shortage entailed by the war and the excessive cost of hire for the latter. Recently the committee have been gleaning information as to the working of battery vehicles, and with a view to induce the Corporation to sanction the purchase of one of these for trial they have made exhaustive inquiries from users, and obtained very satisfactory replies from South Shields, Ipswich, Newcastle, Wolverhampton, Birmingham, Pontypridd, Glasgow, West Ham, Leyton, Edinburgh, Dover, Accrington, Halifax, Carlisle, Ilford, and Chester. Dover has as many as six electric wagons in use.

A tabulated statement was submitted from six of the towns, and the committee reported that a great many municipalities and urban districts had vehicles on order, but under present conditions some time would elapse before delivery could be obtained.

The majority of towns use them for the collection of house refuse, and in all cases there is a saving shown per ton carted as compared with horse haulage. Each vehicle appears to be able to replace about three horses Electrics require very little skilled labour in driving, and in Chester disabled soldiers are employed as drivers.

The type of vehicle recommended for purchase would cost £1,200, and the committee felt that this was not now strictly a matter for economy, although satisfied that the vehicle would prove more economical and satisfactory than horse haulage, but the fact remained that important work had to be left undone owing to scarcity of team labour, and that something must be done, whatever the cost, to keep the town in a cleanly and proper condition. Energy would be supplied by the Electricity Committee at about 1·2d. per unit, which compared favourably with the charge made in the various towns referred to. It would be necessary to expend £90 for installing a charging apparatus. The Corporation adopted the report, and an order will be placed.

IPSWICH'S PIONEER WORK FOR ELECTRICS.

Mr. Frank Ayton, electrical engineer and tramways manager to Ipswich Corporation, and hon. secretary to the Electric Vehicle Committee, in his own report on the Ipswich electricity undertaking, refers to a passage in his report for 1913 referring to the possibility of a new field opening for the use of energy, namely, the electric battery vehicle. "To-day," he continues, "there are five electrical commercial vehicles cared for in the garage opened by the department for the purpose, and four additional ones are expected shortly. The units sold for charging electric vehicles in the garage during the year totalled 13,160. The revenue, including garage charges, was £130. From a total of 150 old-fashioned and out-of-date electric vehicles, nearly all private cars, in use in this country in 1913, the number has grown, by the addition of the modern, and, as proved, highly successful type of commercial vehicle, to over 900. Ipswich was the first municipality in the country to establish a public electric vehicle garage; Glasgow, that most progressive city, followed a close second. There are now over 200 stations in the country where electric vehicles can be charged, and undoubtedly, so soon as the war ends, a great development will take place in this class of automobile for urban work. Before the war the modern type of electric vehicle was not made in this country, being imported from Germany and America. It should be a source of satisfaction to the town that the first British firm to undertake the complete manufacture of the modern type would be one located in Ipswich."

A YEAR'S WORKING AT SHEFFIELD.

In the annual report of the Health Committee of Sheffield Corporation it is stated that during the year ended March 31 last, three additional battery-propelled wagons were placed in service, and orders were given for five more. Further experience with these vehicles has confirmed the favourable opinions expressed in 1915–16 as to their value in refuse collection; in fact, had it not been for their use, the work of the department must have become hopelessly in arrears. The results of the year's working show conclusively that the work can be done more effectively, economically, and with less workmen than by horses. In comparison with the average cost by horse labour over the whole city, the electrics show a saving on bin refuse collection of 8·8d. per ton, and on ashpit refuse of 1s. 7·2d. per ton.

FREEDOM FROM ACCIDENTS COMPETITION.—Encouragement is being given by the borough surveyor of Marylebone to the Corporation workmen entering the Freedom from Accident Competition instituted by the London Safety First Council. The object is to lessen the number of street accidents due to any negligence on the part of drivers of public vehicles.

EXHIBITION OF MOTOR VEHICLES WORKED BY GAS.

A USEFUL SHOW AT THORNYCROFT'S LONDON DEPOT.

It was in the early part of last year, when import difficulties coupled with the rapidly-increasing demands by the Services caused such restrictions to be imposed on the use of petrol that the first steps were taken to experiment with gas for motor vehicles. Many difficulties had to be overcome, but largely owing to the advocacy of the *Commercial Motor* and the *Motor* these were surmounted. Conclusive proof of the success of the innovation was seen at the demonstration of various types of vehicles, all using gas as fuel, which was held on October 10 at Messrs. J. I. Thornycroft's garage, Pulford Street, Westminster.

The demonstration was organised by the journals already named, and its outstanding feature was the great variety of vehicles among the 43 machines exhibited. These ranged from a cycle fitted with a flexible container with 40 cubic feet capacity, to an omnibus seating 40 passengers and fitted with a flexible container holding 800 cubic feet, built and loaned by the Bristol Tramways and Carriage Company. While the majority of the vehicles were of the parcel delivery type, with engines not exceeding 20 H.P., there were a few exceptions which demonstrated the fact that gas can be universally used. Amongst these were a 40-H.P. Thornycroft char-a-bancs equipped to run 18 miles on one charge, a 3-ton Austin market wagon, a 3½-ton Napier covered van, a 3½-ton Wolseley, and two 2-ton Thornycroft lorries. These machines are in regular service, working entirely on gas, and judging from the ease with which each vehicle negotiated the steep gradient from the ground floor of Thornycroft's repair garage to the street, it was evident that ample power was available, although it is generally considered that coal gas is 15 per cent. below petrol in efficiency.

ENROLMENT OF MOTOR VEHICLES.

A CONDITION IMPOSED FOR THE RENEWAL OF FUEL LICENCES.

A reprieve has been granted to motorists, who by an order which was brought into operation on November 1 would not have been allowed to use petrol for any purpose which cannot be justified on the ground of absolute necessity.

The Board of Trade makes the following announcement regarding the endorsement on the demand note forms recently circulated by the Petrol Control Department for the renewal of motor spirit licences (for motor cars) after the end of October:—

> The issue of a licence will be subject to the condition that the licencee shall hold himself or his paid driver, and his motor car or cars, at the disposal of the military authorities for use in the event of a national emergency.

The particular "emergency" contemplated by this endorsement is that which would be caused by the invasion, or apprehended invasion, by an enemy force. In such an event the immediate supply of motor vehicles in districts affected would be of great military value.

The War Office propose to direct the county commandants of counties to ascertain the number of motor vehicles thus available in a county through the Motor Volunteer Corps organisation. The object to be aimed at is the enrolment of sufficient motor vehicles to meet all military needs caused by such a contingency as invasion.

BRISTOL TRAMWAY COMPANY'S GAS OMNIBUS.

The two photographs reproduced on page 349 illustrate the Bristol Tramways and Carriage Company's motor omnibus running on coal gas, which was shown at the recent exhibition in London. The capacity of the bag is 850 cubic feet, a sufficient quantity to drive the omnibus 19½ miles on a hilly route. The average time taken to fill the bag from a 3-in. stand pipe is five and a half minutes. The connecting valve for filling purposes is the company's own design and is said to work extremely well. The total weight of the superstructure and bag is from five to six hundredweight, according to the thickness and quality of the material used. A deep vertical tray carried well forward over the canopy prevents any sagging of the container over the side when partially deflated. There is a very slight loss of power, but not sufficient to diminish the efficiency of the omnibus, which carries 40 passengers.

PETROL ALLOWANCE FOR ESSENTIAL TRADES.—The President of the Board of Trade, in reply to a question in the House of Commons on October 30, said that the allowance of petrol to be granted for use in commercial vans and lorries is under consideration, and the quantities allotted will be confined to the minimum necessary for essential trade.

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MOTOR TRAFFIC.

THE MACINTOSH AND SHREWSBURY NEW SOLID TIRE AND WHEEL WORKS.

As a consequence of the combination of the solid tire works previously carried on by Chas. Macintosh and Company, Limited, and the Shrewsbury S.T. and Challiner Tyre Company at Page Street, Westminster, and the wheel works of the latter company at Camberwell, extensive premises, well suited to the purpose, have been secured by the above-named companies at the corner of Wilton Road and Gillingham Street, S.W. (near Victoria Station), where the most up-to-date service, both with regard to tires and wheels, will at all times be available. Although, owing to the war, it has not been possible to carry out the company's building plans in their entirety, the essential buildings for efficiently carrying on the work have been completed, and on Thursday, October 25, at the invitation of the directors of the companies, a number of Press representatives inspected the premises and the various processes, both in the wheel building and tire fitting departments.

The new premises, which have a ground floor area of 21,000 square feet and 7,500 feet on the upper floors, being easy of access by road and adjacent to three important railways, are well placed to render that prompt attention to repairs and renewals which is so essential to the economic working of motor transport. In addition to extensive loading and unloading platforms for the convenience of the receipt and dispatch of goods for the home and export markets, the ground floor premises include large and lofty garage space,

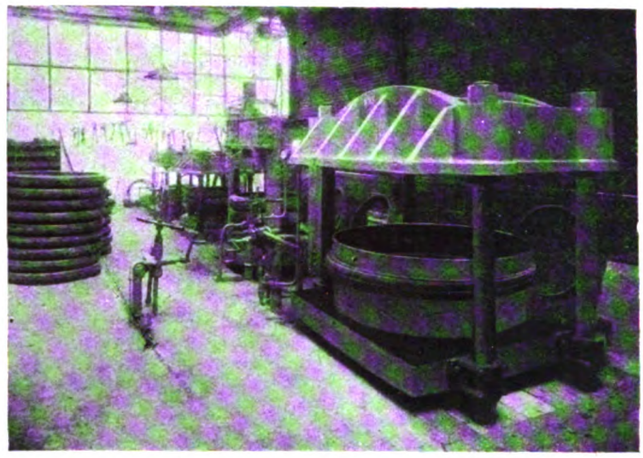
Van with Challiner Cross-Ribbed Tires on Rear Wheels.

where vehicles can be re-wheeled or re-tired with the greatest possible convenience and dispatch. The engineering shops are replete with a range of hydraulic presses of various sizes, including one specially designed for tractor engine wheels fitted with rubber tires up to 5 feet in diameter, plate bending rollers, lathes, welding plant, tire furnaces, and all the latest appliances necessary for a thoroughly up-to-date plant.

A large solid tire store also occupies part of the ground floor space. Here an extensive range of tires of all sizes in general use is held in stock, this being maintained by the regular service of 3-ton Leyland vans running constantly between the stores and the works in Manchester. The pneumatic tire department adjoins the solid tire store, with showroom facing Gillingham Street, and conducts a large business in the sale of tires, tubes, detachable rims, etc.

In addition to the ordinary solid rubber band tires manufactured by Messrs. Chas. Macintosh in every conceivable size and section to meet all requirements of motor traction, the company have displayed great enterprise in producing tires for steam traction engines. They manufacture tires for this class of work in various sizes and sections from 120 mm. to 160 mm., with diameters ranging up to 5 feet, and in order to cope with the great increase of business with this class of tire they have here installed a tire press, which is capable of fitting these large diameter tires in one operation. As the owners of tractors have now recognised the advantage of rubber tires, and the company are fully equipped for orders in every respect for this description of tiring, they anticipate that a much larger volume of business will accrue.

The chief engineer to one of the company's principal tractor tire customers states that he finds now that he has gone over to rubber tires that the tractors give better tractive effort, less shock on starting, and triple the life of the wheels; they also enable them to obtain double life of their axle bearings, less, if any, broken axles, no side-slip or revolving wheels, and they prove ideal for snowy roads. They give triple life to tender bolts, where holes get elongated and have to be renewed after a few months' work. He further states that they get no broken canopy sets or fixing bolts, and an increased speed, less vibration and shock on all roads, with better conformity

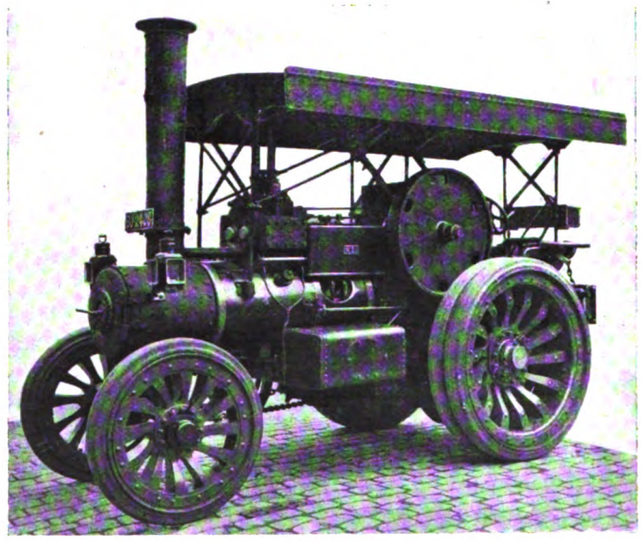


Hydraulic Presses On the Right, Tractor Tire Press.

of tread of tires to comply with the road surface. Further, the life of tractor wheels seldom reaches two years with steel tires, the spokes and the channels strip and crack, and they require re-treading about every 7,000 miles; also tightening up, and the channels want turning down every 2,000 miles. He finds that rubber tires overcome all these defects. The driving of a tractor is very shaky work for the man at the wheel, and here again the rubber tires eradicate trouble.

The life of rubber tires fitted to steam tractors is of great importance, and it is interesting to note that the company have recently re-tired the first set of wheels of 120 mm. section after the original set had completed nearly six years' regular service.

The cross-ribbed tire is a type generally fitted by the company to light delivery vans in place of the ordinary single band tires fitted to the driving wheels, and has proved an excellent non-skid tire. It is also adopted for the important work of fire engines. Recently a set of Challiner cross rib tires, fitted to a fire engine, accomplished a non-stop run of 60 miles at top speed on the occasion of an



Tractor with Macintosh Solid Band Tires.

explosion, and with complete satisfaction, enabling the fire engine to come into operation in record time.

The Macintosh and Shrewsbury and Challiner tires have been adopted by the British, Foreign and Colonial Government departments, also municipalities, motor omnibus and railway companies, and many of the prominent business houses throughout the country.

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MOTOR TRAFFIC.

We give two illustrations of the type of vehicle fitted with tractor and cross-ribbed tires, and a view of the hydraulic presses with the tractor tire press in the foreground.

The wheel department was founded at Camberwell in 1900, to meet the requirements of the rubber tire users of that day. With the advent of the motor vehicle the department became more important, chassis builders submitted their designs, and in a very short period the department grew to be one of the leading centres of motor wheel building. No expense has been spared in putting down machines of every type to meet the advances in motor wheel construction.

Almost from the commencement of the war the department (now "controlled" by the Government) has been fully employed on wheel building for the Ministry and war service vehicles. Particularly interesting are the Challiner twin detachable rim wheels, now being turned out in large quantities for Red Cross ambulances and other war service vehicles. The Camberwell premises were taken over by the Government in June last, and a severe task was given the department to put down plant at short notice in the new premises, and to keep up the weekly deliveries of their war service contracts. The difficulty was, however, overcome.

The workshops are set out in model fashion, capable of undertaking the building of motor wheels of every description, and the output still goes on and on, showing what can be done by a firm intent on doing their utmost to advance and maintain the prestige of British manufacturers.

STEAM WAGON WORKING COSTS.

Included in the report of Mr. J. C. Haller, county surveyor of Nottinghamshire, for 1916–17, is the appended table of the cost and working of two steam wagons :—

	Burrell.	Clayton and Shuttleworth.
Date purchased	Nov., 1915	July, 1916
Cost with two trailers	£800	£850
Working period, up to March 31, 1917	12 months	8 months
Working costs :—	£ s. d.	£ s. d.
Wages	144 7 9	123 0 8
Coal	80 4 1	60 9 0
Oil	8 16 9	6 0 10
Repairs, tires, etc.	103 10 9	33 7 2
	£336 19 4	£222 17 8
Add depreciation at 12½ per cent. ...	100 0 0	70 16 8
	£436 19 4	£293 14 4
No. of days worked	257	207
,, loads hauled	847	744
,, tons carried	7,513	6,602
,, miles travelled	5,080	3,357
,, miles travelled loaded	2,540	1,678
,, tons hauled per journey ...	8·87	8·86
Cost per day	£1 14 0	£1 8 4½
,, mile	3s. 5½d.	3s. 6d.
,, ton per mile	4·65d.	4·75d.

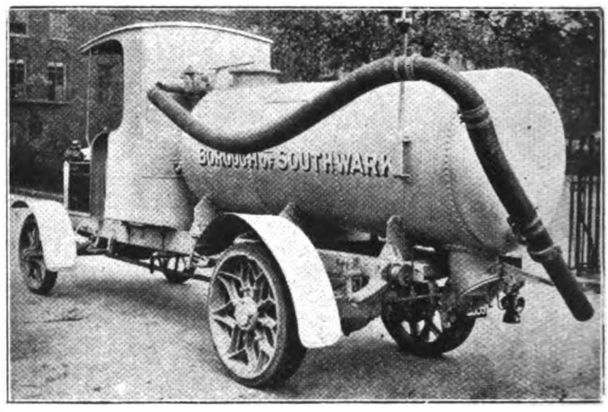
At 4¾d. per ton-mile the cost of haulage comes out below the estimate of 5d., and despite of the increased cost of wages and materials Mr. Haller is of opinion that the work will continue to be carried out within the rate mentioned. It would have been impossible, he adds, to have carried out the work dealt with in his report if he had been without wagons. An order for a third steam wagon and trailers was placed some time ago, but owing to the demands of the army for wagons of this type some months are expected to elapse before delivery.

GERMAN MOTOR WORKS PRODUCING AIRCRAFT.—Of late the German motor manufactories have been producing aircraft on an increasing scale. The Daimler Company, of Haustatt-Stuttgart, have increased their capital from £1,200,000 to £1,600,000, and the Imperial Bank have aided the flotation of the new shares. In a circular the company state that they can no longer expand their works, but must build new factories. "An additional purpose," the company state, is "to strengthen their resources for the duties which industry will have to perform after the war."

STRAKER MACHINES FOR MARYLEBONE COUNCIL.

The Marylebone Borough Council has for some time past had under consideration suggestions for the improvement of its system of street cleansing, and at the last meeting of the Council it was decided to adopt the recommendation of the Highways Committee whereby the whole of this work was carried out by its own employees by means of special street cleansing machines, to be purchased from Messrs. Straker-Squire, Blackfriars, London, S.E.

From the report which the Highways Committee have prepared it was shown that the work of emptying and cleansing the street gullies has hitherto been carried out by contractors, who supplied



"Straker" Vacuum Gulley Cleaner.

four slop vans, horses and drivers at a cost of £4 per day, supplemented by two water vans, horses and drivers and four gulley men provided by the Council at a cost of £3 6s. per day, a total cost of £7 6s. per day. With a view to effecting an economy, as well as having the work carried out under more hygienic conditions, the committee recently inspected the Straker-Squire vacuum gully cleaner and high pressure street washer, which have been used so satisfactorily by the Southwark Borough Council for the past two years. From the records obtained from the Southwark borough surveyor of the work done by the gully cleaner, it was estimated that the whole of the street gullies in St. Marylebone could be efficiently dealt with by the use of one machine at a cost of £4 8s. per day, thus showing a saving of £2 18s. per day. The cost of this machine, an illustration of which is given above, is £950, so that the annual saving effected by its use is almost equal to its full cost. The

"Straker" High-Pressure Street Washer.

capacity of the tank or container is 800 gallons, and on an average 50 gullies per day can be cleared. The chassis is the Straker-Squire standard 5-ton machine.

In recommending the purchase of the Straker-Squire high pressure street washer, which is shown in the second illustration, the committee recalls the fact that it had been unable to obtain delivery of a "Laffly" motor road sweeper, owing to the French Government having commandeered the output of the Laffly works. It is of the opinion, however, that a much more efficient machine has now been discovered in the Straker-Squire road washer, which has been tested with most satisfactory results.

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MOTOR TRAFFIC.

The cost of the Straker-Squire road washer is £950. It is fitted with a tank capable of holding 1,100 gallons of water, which is sprayed on to the road surface through two spherical nozzles, fitted in front of the chassis, under a pressure varying between 36 and 60 lbs. per square inch by means of a centrifugal pump driven by the engine. The high pressure water, which is directed at an angle of 45 degrees, loosens the dirt, and the road surface is then cleansed by means of rubber squeegees fixed under the chassis about midway between the two axles. In order to be adaptable to the inequalities of the road surface the squeegees are made in three sections and mounted upon a hinged framework. It is claimed that from 20 to 25 miles of roadway can be washed per day, while in dry weather the machine can also be used for ordinary street watering.

MOTOR VEHICLES FOR MUNICIPALITIES.

STALYBRIDGE COUNCIL propose to obtain a motor fire engine.

ROTHWELL COUNCIL have ordered a 3-ton lorry at a cost of £731.

NEWCASTLE CORPORATION have purchased a first-aid motor car.

THORNABY COUNCIL contemplate the purchase of a motor fire engine.

BATH COUNCIL have placed an order for a 5-ton Sentinel steam wagon with Messrs. Alley and Maclellan, Limited, at £970.

BOLTON GAS COMMITTEE have received two tenders for the supply of a motor wagon.

ESSEX COUNTY COUNCIL have sanctioned the purchase of steam lorries at a cost not exceeding £1,000.

LEEDS CORPORATION have sanctioned the provision of a workshop at the fire brigade station for the repair of motor vehicles, the cost not to exceed £300.

CALCUTTA MUNICIPAL COUNCIL having proved the economy of motor vehicles for street cleansing work have decided to obtain two additional wagons.

SALFORD COUNCIL have placed an order with a local firm for the supply of a 2-3 ton 20-H.P. Austin chassis, with tipping body, steel-lined, and accessories for £764.

HALIFAX CORPORATION have cancelled the order given to Messrs. Alley and Maclellan, of Shrewsbury, for two Sentinel steam wagons, at £740 each, the firm finding it impossible to guarantee delivery within the period required.

SOUTHEND CORPORATION have obtained a "B" priority certificate in lieu of the "C" certificate originally allowed by the Ministry of Munitions for four battery vehicles ordered from Messrs. Ransome, Sims, and Jefferies, of Ipswich.

NORWICH CITY COUNCIL have adopted a scheme of refuse collection and disposal, which includes the purchase of five 4-ton battery wagons at £1,200 each. It is estimated that 27,000 tons will require to be transported yearly an average of 2½ miles, i.e., five miles for the double journey, at 3½d. per ton per mile of the double journey.

BIRMINGHAM HIGHWAYS DEPARTMENT, according to the report of Mr. H. E. Stilgoe, the city engineer, for 1916–17, require additional motor appliances owing to the shortage of labour and the change of conditions under which work will have to be carried on. Four steam wagons and three tractors, with nine trailers, already in service, have been of great service. Two petrol-driven street sweepers have been purchased, another has been built in the Corporation shops on the chassis of a disused car, and a fourth is in hand. Inquiry has been made for others, but makers find it impossible to promise delivery, owing to pressure of war work. A combined sweeper with elevator for automatically loading the sweepings into a wagon was obtained during the year, and Mr. Stilgoe states that this type of machine will be of great assistance. A similar machine is about to be delivered.

MOTOR WAGONS TO RELIEVE RAILWAYS.

In connection with the scheme initiated by the Ministry of Munitions for the use of commercial motor vehicles in order to relieve the pressure on the railways, the Sheffield and Manchester Chambers of Commerce have started a service between those cities. For some years past motor vehicles have been used to a great extent in the cotton traffic between Manchester, Liverpool, and other Lancashire towns, and during the past year the Manchester Chamber of Commerce has inaugurated a return load organisation for the purpose of extending this traffic.

A Portion of a Recent Convoy of 2-3 Ton Austin Lorries.

Several of these vehicles on leaving the works at Northfield, made very successful journeys to Glasgow.

For some months the Leeds district office of the Ministry of Munitions has been engaged in encouraging motor transport between various places in Yorkshire and the adjoining counties. In a communication from the Leeds office which was recently received by the Ossett Chamber of Commerce it was stated that if there was a shortage of privately-owned wagons for short distance traffic the question of providing Government vehicles would have to be considered. In the course of the discussion on the Leeds letter, a member stated that his firm had to send goods by rail which could be delivered by their motor wagons if they could obtain a sufficient allowance of petrol. Although the firm could not obtain petrol, yet they could hire motors for the work. Another member remarked that if return loads could be obtained for other people it would be a great benefit to local trade. The Chamber decided to point out to the Ministry of Munitions that at present full use could not be made of motor vehicles on account of the unequal and insufficient petrol supply.

INSTITUTION OF AUTOMOBILE ENGINEERS.

The second ordinary meeting of the Institution of Automobile Engineers was held in the Physics Lecture Room, University College, Gower Street, W., on November 14, when Dr. E. G. Coker read a paper entitled "Photo Elasticity for Engineers." Dr. Coker dealt with further important researches which he has been making on the demonstration of stresses by means of the polariscope, and for this purpose the principal illustrations were shown by means of lantern slides.

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MOTOR TRAFFIC.

COMMERCIAL VEHICLES IN NATIONAL SERVICE.

NOTES ON AN ADDRESS BY FIELD-MARSHALL VISCOUNT FRENCH.

In speaking at a meeting held on November 7, and organised by the London Chamber of Commerce in conjunction with the City of London Motor Transport Volunteers, Lord French stated that, without adequate motor transport, the whole existing volunteer organisation would be rendered completely useless for its main purpose; that is to say, for assisting the regular army in the event of invasion. Should any such contingency arise—and Lord French clearly does not regard it as impossible—the various units of the Volunteer force would have to be concentrated at the points selected for that purpose, in the course of a very few hours. This could only be done by utilising large numbers of motor vehicles, which must necessarily be enrolled and organised in advance. The next step would be the conveyance of the Volunteers and their impedimenta to the point or points threatened. This, again, would have to be accomplished with the greatest possible despatch, and motors are quite essential for this purpose also. In short, the whole real utility of a Volunteer Force for home defence is conditional on extreme mobility which, lacking ample motor transport, would be quite unattainable.

Motor drivers, enrolling with their vehicles, do not require any considerable technical training. They are already fully competent to carry out their most important duties. A few drills are, however, necessary, and also a certain amount of map reading. It is intended to bring down formal drills to an irreducible minimum, as it is recognised that the men, already having arduous civilian duties to perform, cannot be asked to give very much time to such additional work. Efforts are also being made to arrive at some satisfactory understanding as to the compensation which would be paid in the event of injury to the driver or damage to his vehicle while on military service in time of emergency.

As to the classes of machine required, it would appear that the principal requirement is for substantial industrial vehicles, whether propelled by steam or by petrol. In some districts, but not in all, light cars may also be utilised. This depends on the local relation between supply and demand. At present, the total demand is not yet exactly known, but steps are being taken to estimate it promptly. In the meanwhile, we have the assurance of Lord French that all the available vehicles would not be too many, and interest is evinced in the possibility of putting on the road again the considerable number of machines that are now out of commission for comparatively trifling causes, such as the lack of small replacements or of repairing facilities.

It should be understood that while service in national emergency is the first and foremost requirement which the motor volunteer agrees to fill, he may, if he be willing, enrol also for another class of service, of a less absolutely essential, but nevertheless very important kind. The County of London Motor Volunteers have, in this secondary type of service, actually covered over one million miles since their first formation, and fully 100,000 miles during the last three months. Their work has been varied. It has consisted partly of the conveyance of staff officers, and, on occasions, of German prisoners; the evacuation of hospitals; and particularly of meeting at London stations men returned from the front on short leave, and conveying them to other termini or to their destination, according to circumstances. This is admirably useful work of its kind and, as Lord French tells us, has a special value in its indication to the troops, and particularly to those who hail from the oversea Dominions, that their friends at home are ready and anxious to do everything possible for them.

The case in favour of supporting the Motor Volunteer movement is altogether a very strong one, even if we do not take into account the fact that nowadays every petrol licence is granted subject to the provision that the licensee places the services of his car and of himself or his driver at the disposal of the Government in the event of national emergency. This being so, it would seem best to do the thing with a good grace, and in that case enrolment in the volunteers is the obvious and proper course. The meeting to which this note refers acknowledged the principle in a resolution, carried unanimously, to the effect, "This meeting of owners and users of commercial motor vehicles fully recognises the need for enrolment through the Motor Transport Volunteers and recommends the movement to all concerned."

HOURS OF MOONLIGHT.—Messrs. C. A. Vandervell and Company, Limited, have issued a picture postcard in black and white, giving a useful moonlight chart, from which the hours of moonlight can be seen at a glance. The chart was compiled by Mr. A. H. Midgley, their chief engineer.

MOTOR TRAFFIC NOTES.

FOOTPATH SEAT FOR OMNIBUS PASSENGERS.—Kensington Borough Council have agreed that a seat should be placed on the pavement at the corner of Kensington Road and Palace Gate for the convenience of passengers who have to wait considerable periods for motor omnibuses. The Council have asked the Metropolitan Public Gardens Association to provide the seat.

LONDON AMBULANCE SERVICE.—The number of calls for the last three years on the London County Council motor ambulance service have been:—1915, 2,405; 1916, 9,244; 1917 (to October 21), 10,014. Commander Sladen, R.N., chief officer of the fire brigade, and Dr. Mugliston have organised the service with great efficiency. During the recent raids it promptly removed the sufferers to hospitals.

OMNIBUSES AND NEW ROUTES.—For several months Ilford Urban Council have been in communication with the London General Omnibus Company in reference to the alleged use of new routes, contrary to the Emergency Act, 1916. The Council have now decided to adjourn for the present the question of taking legal proceedings. By the company it has been contended that the route used is not a new one.

U.S.A. GIFT OF LORRIES TO LONDON.—The Motor Transport Volunteers, who provide the official transport of leave troops from the various London stations during the night, have received gifts of motor lorries from America, thanks to the propaganda in the United States of Lady Lister Kaye, wife of Sir John Lister Kaye, who, with Commandant C. R. Freemantle, founded the corps in February, 1916. Lorries have been presented by New York City, Newport, Rhode Island, the State of California, and one by Lieut. J. Cromwell, Philadelphia.

CHARGING OF ELECTRIC DELIVERY VANS.—John Barker and Company, of Kensington, have applied to the Borough Council for consent to be given to the retention of four iron brackets fixed to the wall of their premises, and overhanging the public footway. The brackets are used to support cables in connection with the charging of the company's electric vehicles, the arrangement being a temporary one. Provided that the cables are adjusted so as not to interfere with pedestrian and vehicular traffic, the Borough Council have recommended that the County Council should permit the brackets to be retained until the termination of the war and for six months after.

A JUDGE'S AID TO PETROL ECONOMY.—Mr. Justice Eve was recently trying an action in the Chancery Division when he decided that the proceedings would be shortened if he inspected the premises at Tottenham which were concerned. Upon counsel suggesting that a cab should be hired, the judge refused to be a party to the waste of petrol, and said he could journey comfortably by train from Liverpool Street to Bruce Grove. A shorter journey from the court would have been by tramcar from Holborn. It is encouraging to find that there is one highly-placed personage who is awake to the need for petrol economy, and it would be advantageous to the country if the majority of the motor-cab drivers—a dissatisfied class—could be put on to driving industrial vehicles. Adequate facilities for passenger transport in London are provided by the railway, tramway, and omnibus services.

REAR WHEEL GUARDS TO NEW YORK OMNIBUSES.

The Fifth Avenue Coach Company, New York City, have adopted a rear wheel guard similar to that of the London General Omnibus Company. *The Electric Railway Journal* (New York) states that the fenders are "located on either side of the 'buses, between the front and rear wheels, and curve outward toward the rear, so that rear wheels of each vehicle are thoroughly protected. Oddly enough, the majority of accidents to pedestrians in the streets of both New York and London on account of the motor omnibus have been rear wheel accidents. In New York all classes of omnibus accidents are surprisingly few, the record last year being on the basis of one pedestrian injured to more than 1,500,000 miles of service. This excellent showing is largely due to the fact that the company is exceedingly careful in the selection and training of its chauffeurs, so that avoidable accidents to pedestrians have been almost wholly eliminated. With the installation of the fenders it is believed that mishaps to persons in the streets will be practically a thing of the past. These fenders, it may be said, were provided on the company's own initiative, its safety record having been such that its equipment has never been unfavourably criticised by the public authorities."

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery and erection of Three Fan Draught Cooling Towers, at Stuart Street Station.

Specification, drawings and form of tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Engineer and Manager, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Wednesday, December 12, 1917.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
November 9, 1917.

CITY OF CARLISLE.

Electricity Department.

The Corporation of Carlisle invite tenders for the supply, delivery and erection of the following plant:—

1. One 1,500/2,000 kw. High-Pressure Turbo-Alternator.
2. One Surface Condensing Plant for above Turbo-Alternator.

Specification, with general conditions and form of tender, may be obtained from the undersigned at the Electricity Offices, Victoria Viaduct, Carlisle, upon payment of a deposit of Two Guineas for each section, which will be returned after the tenders have been adjudicated upon, provided a *bona-fide* tender is sent in by the date specified and not withdrawn. Extra copies of each specification may be obtained at the sum of 5s., which is not returnable.

Tenders, properly endorsed and sealed with wax, to be sent to the undersigned not later than 9 a.m. on Tuesday, December 4, 1917.

The contracts are subject to the sanction of the Local Government Board, and the Corporation do not bind themselves to accept the lowest or any tender, nor will the Corporation pay any cost incurred in tendering.

FREDK. W. PURSE, M.I.E.E., M.I.MECH.E.,
City Electrical Engineer.

Electricity Offices,
Victoria Viaduct, Carlisle.
November 9, 1917.

PATENT FOR PREVENTING CORRUGATION.

The Owner of British Patent No. 23,859 of 1911 for "Improvements in Rails, especially Tramway Rails, for preventing the formation of Corrugations," is desirous of arranging, by Licence or otherwise, on reasonable terms, the manufacture and commercial development of the invention in this country.—For particulars, address HERBERT HADDAN & Co., Chartered Patent Agents, 31 and 32, Bedford Street, Strand, London, W.C.2.

THE BARRY RAILWAY COMPANY.

The Barry Railway Company are prepared to receive tenders for the supply of General Stores and Materials, including Iron, Oils, Steel, Timber, Varnishes, Waste, Wire Ropes, etc., etc., for Six Months from January 1, 1918.

Specification, with Form of Tender, may be obtained from the undersigned.

Applicants are requested to particularise the Stores for which they wish to Tender.

After forms have been obtained, Samples and Patterns can be seen between the hours of 10 a.m. and 4 p.m. (Saturdays from 10 a.m. to 12 noon) at the Storekeeper's Office, Broad Street, Barry.

Sealed Tenders, endorsed "Tender for——," to be in the hands of the undersigned not later than 10 a.m. on November 27, 1917.

The Company do not bind themselves to accept the lowest or any Tender.

E. T. LAWRENCE,
Secretary.

Company's Offices,
Barry Docks, Glam.,
November 6, 1917.

POSITIONS VACANT.

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPARTMENT.

Appointment of Secretary.

Applications are invited for the position of Secretary in the Corporation Electric Supply Department.

Applicants should have had a sound commercial training in some large mercantile, manufacturing, or electric supply undertaking, and should possess a certain amount of technical knowledge in connection with electric supply business.

The salary will be at the rate of Eight Hundred Pounds per annum.

The successful candidate will be required to contribute to the Corporation Superannuati n Scheme.

Forms of application for the above appointment and particulars of duties may be obtained from the undersigned, and should be sent, accompanied by copies of not more than three testimonials addressed to the Chairman, the Electric Supply Committee, 14, Dale End, Birmingham.

Each application must be endorsed on the envelope "Appointment of Secretary," and must reach this office not later than noon, November 26, 1917.

HOWARD FOULDS,
Secretary.

14, Dale End, Birmingham.
November 12, 1917.

BOROUGH OF LEIGH.

Electricity Department.

Appointment of Engineer and Manager.

The Corporation of Leigh invite applications for the above appointment at a commencing salary of £300 per annum.

Candidates must be fully qualified electrical engineers, and have had experience in the management of an electricity undertaking comprising supplies for lighting and power.

The person appointed will be required to reside within the borough, and must devote the whole of his time to the duties of the office, and not engage in private practice as an electrical engineer, or in any other occupation.

Applications endorsed "Electrical Engineer," to be accompanied by copies of not more than three testimonials, must be delivered to me not later than Friday, November 23, 1917.

Canvassing members of the Council will be a disqualification.

W. H. COWBURN,
Town Clerk.

Town Hall, Leigh,
November 9, 1917.

MOTOR OMNIBUS INSPECTORS.

Motor Omnibus Inspectors wanted. Only those who have had experience in a similar capacity need apply. MAIDSTONE AND DISTRICT MOTOR SERVICES, LTD., Maidstone.

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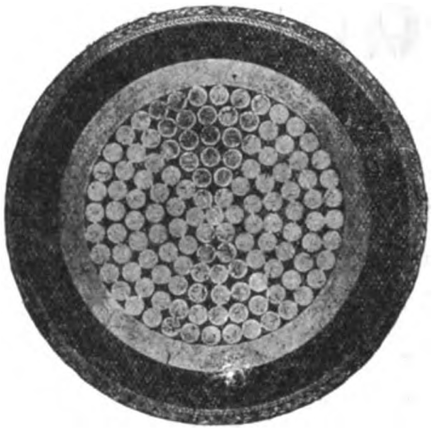

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, NOVEMBER 17, 1917.

A NATIONAL TRAMWAY COMMITTEE.

GREAT interest is being taken both by tramway authorities and by the general public in the important new scheme propounded by the Board of Trade for facilitating the maintenance and operation of tramways throughout the country which are considered essential to the prosecution of the war. The public, however, take an interest for a different reason from that which actuates the tramway authorities. People's attention has been roused by the misleading statements which have been put forward in some newspapers as to the undertakings being brought under Government control and management to the dispossession or the limiting of the powers of the present executive officers. A cry was even raised that the tramways owned by municipalities were to be put under the control of a gentleman associated with private tramway enterprise. Attempts were, in fact, made to raise political recrimination, but these were shown to have no foundation in the light of the official announcement issued on Monday last and amplified by the President of the Board of Trade in the House of Commons on Wednesday. The first published statement in regard to the proposal was made in our issue of November 3, and in that and the note in our last issue the true facts were set out. As stated in the former issue, the President of the Board of Trade, as a result of representations from the Ministry of Munitions and National Service, invited the Executive Council of the two tramway associations to meet him. After thanking them for the opportunity of meeting them, the President stated that the questions of tramway service, increase of fares, supplies for repair of rolling stock and track, inadequacy of existing and establishment of additional services in all parts of the country had been engaging the attention of the Board of Trade and Ministry of Munitions for a considerable time. In consultation with Mr. Kellaway, the Minister of Munitions had come to the conclusion that it was desirable to set up some organisation to which all these undertakings could refer their difficulties, in order that the problem might be dealt with promptly and efficiently. That suggestion has now been adopted. There is consequently no reason for complaint on the part of any of those who imagined that an insidious scheme had been devised to bring municipal tramways under outside control. Such an idea was, of course, absurd. Public interest will not suffer by the change, unless it be through a curtailment or cessation of services on some lines where traffic is light and unessential. The whole basis for the Board of Trade's proposal is that tramway authorities are finding increasing difficulties in getting rails and other materials for repairs and maintenance both of the track and rolling stock, and it is practically impossible to obtain additional cars to meet increasing demands. At the same time it is imperative that a large proportion of the tramways of the country should give the fullest service in order to carry to and from their work the multitudes of men and women engaged in munition factories and other service of national importance. The Board of Trade considered that a good deal of the trouble might be removed by getting rid of the dual control—such as it is—of themselves and of the Ministry of Munitions and by substituting a committee. This is what has been done, and Mr. James Devonshire has been invited to act as chairman of the Committee. The Committee will consist of seven members, four representing municipally operated tramways and three company-owned lines. Of this number the Chairman and Mr. Fell, general manager of the London County Council tramways, have been appointed by the Board of Trade, Mr. J. B. Hamilton, chairman of the Executive Committee of the Municipal Tramway Association, Mr. J. M. McElroy and Mr. A. R. Fearnley have been nominated by the Municipal Tramways Association, and Mr. Stephen Sellon and Mr. R. J. Howley by the Tramways and Light Railways Association. It may, we think, be safely assumed that the interest of all parties will be fairly conserved in the capable hands of these gentlemen, who possess such wide experience in tramway matters. The duties which the Committee will have to perform, under the President of the Board of Trade, will include arrangements necessary for the provision to all essential tramways—as far as that may be within the range of possibility—of labour and an adequate supply of materials for maintenance and repairs. If sufficient new rails cannot be bought, it is possible that some lines of a non-essential kind may be lifted and the rails used where they are more vitally needed. The cars so set free may be transferred to places where there is a need for more vehicles for conveying people engaged on national service. Possibly the Committee may also be able to give help in the way of finding additional labour. The present managers of tramways will go on managing them as before, subject only to the help afforded by the Committee and in some cases to the deprivation caused by the Committee's action. There is every reason to believe that those responsible for tramways the country over will welcome the new scheme as being for the general interest. Incidentally, some of them will be relieved from much trouble and anxiety, while a minority may have their trouble increased. It is all for the general weal, and loyal adhesion may everywhere be expected.

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L.C.C. TRAMWAY MATTERS.

FARES AND TRANSFER TICKETS.

At the meeting of the London County Council on Tuesday a long discussion took place with regard to fare changes and the withdrawal of transfer tickets. On July 17 the Highways Committee reported that they had agreed to the recommendations of their special sub-committee on tramway operation, providing for the issue of transfer tickets only where there were no direct services, and that transfer tickets should be available for change of cars at specified points only. These operations came into force on October 3. In a statement read to the Council by the chairman of the Highways Committee, on October 15, it was claimed that the alterations had reduced the work of the conductors, with the immediate result of more efficient fare collection, better attention on the platforms and improved time-keeping. The grouping of passengers according to their destinations had enabled them to travel direct instead of being forced to take another car and exchange, owing to their being crowded out by passengers who should travel by another route. Congestion at large distributing centres has been considerably reduced, as the only passengers exchanging are the through passengers for whom a direct service cannot be provided. The limitation of transfer passengers to definite exchange points enables those points to be indicated on the ticket, and for passengers who are unfamiliar with the routes this was a great convenience. Conductors and ticket inspectors are thereby able to check more efficiently excess riding. Briefly, the ticket scheme was simplified, conductors could be held responsible for their work, risk of accidents was reduced, delay at junctions minimised, and the occasion for disputes between conductors and inspectors on the one hand, and passengers on the other, was removed. The total number of transfer fare stages was 421, or 26 more than the number prior to March, 1915. It was stated that on no other important tramway have workmen enjoyed such facilities as are accorded to workmen in London. The general manager has since reported on the effect of the alterations after four weeks' experience, and remarks that all district traffic superintendents directly responsible for the working have reported favourably on the effect of the altered arrangements. Experience has confirmed the expectation that the alteration in transfer facilities would lead to a more effective control over the traffic, and an improvement has also been made in the carrying capacity by acceleration of the services. The volume of well-founded complaint has been infinitesimal.

Mr. H. H. Gordon, J.P., moved that the report of the Highways Committee in respect to fare changes be not received, and severely criticised the changes, called adjustments, which had been made in the tramway administration, specially in regard to the transfer tickets. It was a universal traffic law that where facilities were increased, there was an increased traffic flow and *vice versa*. The figures showed that during the last fortnight the passengers had been reduced by over a million, despite the absence of motor bus competition. He detailed the irregularity of the various services, and said the time had come when they should take a higher view as to their duties as an authority catering for the greatest city in the world. In this time of national stress and emergency, their duty was not to look so much to financial results as to the public interests the undertaking was serving in carrying workers.

Mr. J. D. Gilbert, M.P., seconded, and contended that the reorganisation scheme brought forward last February had not been justified by the results.

Mr. H. Mills, J.P., said there was the greatest dissatisfaction throughout London with the tramway services.

Mr. G. Hardy suggested that the new traffic managers had failed to evolve better services.

Sir John Benn, J.P., while admitting the extraordinary difficulties of the tramway business under the present conditions, said the tramway grievances were causing serious unrest in London, and something would have to be done.

Lord Haddo, Mr. T. Gautrey, Mr. G. Dew, Mr. W. J. Squires and others having spoken, Mr. G. Hume (chairman of the Highways Committee) replied, pointing out that at the present time conditions were rapidly changing, and this necessitated changes in administration which might appear to outsiders to be inconsistent. It had been found impossible to continue the services unless the conditions of travelling were stiffened up. They were working under conditions which made regular services impossible, and he alluded to the shortage of men, which prevented anything like the former number of cars to be run. All transit undertakings were suffering in similar ways, and it was in the public interest that the tramway service, though reduced and altered, should continue to be run. He thought it was most unfortunate that attacks should be made on the management. Let them criticise the Highways Committee if they liked, but not go behind the committee to the officers. They did not know what the future had in store for them, but he asked the Council to appreciate the many difficulties with which the administration had to contend. Everyone connected with the undertaking was doing his duty, and if they were dissatisfied with the Highways Committee, the Council could elect another committee in its place to carry on the work in a better way than had been done.

The motion was negatived, and a claim for a division was not granted.

Lancashire and Cheshire Tramways Managers' Association has accepted the invitation of the Tramways Committee of Blackburn to hold its November meeting in Blackburn.

MAINTENANCE AND LABOUR FOR TRAMWAYS.

A REPRESENTATIVE COMMITTEE APPOINTED.

In our issue of November 3 we foreshadowed the appointment by the Board of Trade of a Committee fully representative of tramway interests to co-ordinate the supply of materials and labour, and on November 10 we announced the appointment of Mr. James Devonshire as Chairman of the proposed committee.

On November 12 the Board of Trade issued the following statement:—

"In view of the difficulty in meeting the demands for various materials and labour required for the maintenance and renewal of the permanent way and rolling stock of the tramway undertakings, the Board of Trade are appointing a Committee to consider the needs of these undertakings, so that the necessary steps may be taken to supply, as far as possible, such needs, even though it may be at some temporary sacrifice to less essential undertakings.

"The Municipal Tramways Association and the Tramways and Light Railways Association are being invited to nominate members to the Committee, and the Board have asked the London County Council to allow Mr. A. L. C. Fell, the manager of their tramways, to serve on it.

"Mr. James Devonshire has been invited to be Chairman of the Committee. It is not intended that the control of tramways undertakings should be interfered with by the Committee."

STATEMENT BY THE PRESIDENT OF THE BOARD OF TRADE.

The subject was raised in the House of Commons, on November 14, by questions addressed to the President of the Board of Trade, and the latter in his answers gave some information that had not previously been published. It will be noted that the questions were hostile in tone, and that Sir Albert Stanley made effective replies.

Mr. Gilbert asked the President of the Board of Trade for what reason he proposed to set up a committee dealing with municipal and company tramways; if he would state how many members it consisted of, and what interests they represented, and what were the references to the committee; if he would state if a Mr. Devonshire had been appointed chairman of the committee, and, if so, for what reason he had been so appointed; and if he would give the public record of his present and past connection with tramway undertakings in this country.

Sir A. Stanley: As the hon. gentleman will have seen from announcements in the public Press, the object of the committee is not to take control of tramway undertakings, but to meet the needs of those undertakings engaged in work essential to the prosecution of the war. It is proposed to have four representatives of municipal tramway undertakings, and two representatives of private companies on the committee. It is proposed that Mr. Devonshire should be chairman of the committee. His knowledge and practical experience of tramway questions are, I think, well known to tramway authorities. I am confident that those who can speak for municipal and company tramways will recognise his suitability for the post which I hope he will undertake.

Mr. Gilbert: Can the right hon. gentleman say whether it is not a fact that one of the large tramway companies with which Mr. Devonshire is connected is now in the hands of the Official Receiver, and whether he thinks that a gentleman with an experience like that is a suitable person to put on this committee which is going to deal with municipal undertakings?

Sir A. Stanley: I believe that one of these undertakings is in the hands of the Official Receiver, but I cannot see that that is any bar. I must remind the hon. member that of the representatives on this committee municipal undertakings have four and private companies two.

Mr. Gilbert: Is the idea of this committee not to pool rolling stock and tramway material, and is not the idea of this committee to help companies which are in the hands of the Official Receiver and which have not got good rolling stock and tramway material?

Sir A. Stanley: The financial position of any particular tramway undertaking is not under consideration. The sole purpose of this inquiry is to secure that the tramway undertakings which it is necessary to carry on should have the necessary material in order to keep them going. There is nothing more.

The names of the members of the committee are announced elsewhere in this issue.

MOTOR TRAFFIC CO-ORDINATION.

The transport section of the Ministry of Munitions, Quebec Chambers, Leeds, have arranged a scheme of mechanical transport control for the West Riding of Yorkshire. It came into operation on November 12, the object being to provide loads for empty journeys lorries are at present running, and for lorries not fully employed within a radius of about 20 miles of loading point. Five per cent. will be deducted from the earnings to cover the expenses of the department. The Ministry of Food have sent a memorandum to local Food Control Committees on the subject of co-ordination of traders' transport, which they are urged to endeavour to bring about by December 1.

The scheme was accepted at a meeting of motor haulage contractors held on November 14 at Leeds, the meeting feeling that there was no course but to do so, as the supply of petrol is controlled, and also, in the last resort the Ministry could utilise A.S.C. wagons. By supporting the scheme the contractors will ensure the carrying on of their businesses and stand in a better position to secure spare parts and petrol.

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THE CONSTRUCTION OF MOTOR OMNIBUSES.

Sir E. Henry, Commissioner of Metropolitan Police, has issued the following notice inviting the co-operation of manufacturers and designers of motor omnibuses :—

The Commissioner of Police of the Metropolis, as the autnority for licensing public carriages, issued a notice dated April 3, 1917, with regard to the future construction of motor vehicles intended for licensing as motor omnibuses within the Metropolitan area. Since that date he has received several communications from those concerned with the manufacture and use of these vehicles. In 1909, acting upon expert advice and after a conference with manufacturers and users, the Commissioner notified that no new vehicle would be licensed for public service which exceeded three and a half tons unladen weight, or, alternatively, which exceeded a gross weight fully laden of six tons.

Even with those limitations of weight, representations are still being received from residents along omnibus routes, who complain of the excessive vibration caused by these vehicles, and of the damage done to their houses. As stated in the notice of April, 1917, the present time appears opportune for reviewing licensing requirements, and summarising those deemed of cardinal importance.

It is not proposed to insist upon vehicles of smaller dimensions or with less seating capacity than the existing type. On the other hand, it is not contemplated to agree to any increase in size or in seating capacity, as the existing scale of a maximum of 34 seats best meets London traffic requirements.

It is realised, in respect of the weight of the vehicle and weight effect on roads, that improvements may be secured by careful reconsideration of all the details of construction of the chassis, road wheels, power and transmission mechanism, including the use of modern materials of high mechanical properties, and that the reduction thereby effected will compensate for any slight additions of weight needed for the improvement of springs, wheels, etc.

In the Commissioner's opinion, he would be justified in agreeing to some increase of weight in component parts needed to secure improvement in springing and in the wheels, the object aimed at being reduction of impact shock, more especially on damaged road surfaces, but for this increase of weight in certain parts there should be a reduction elsewhere.

In summarising the points of cardinal importance, attention is called to the following :—

1. The seating capacity of the motor omnibus shall be for not more than 34 passengers.
2. The weight shall not be more than three and a half tons unladen or six tons fully laden.
3. The weight must be so distributed that the front wheels are not unduly loaded.
4. The length of the vehicle must not exceed 23 feet.
5. The breadth overall must not exceed 7 ft. 2 ins. at any part.
6. Each vehicle must be provided with two effective and independent and independently operative brakes acting on the back wheels.
7. The wheel track should not be less than 5 ft. 6 ins. centre to centre of tyres for both front and back wheels.
8. The distance between the outsides of the back springs shall not be less than 45 ins., and of the front springs not less than 38 ins.
9. The requirements as laid down in the Notice to Proprietors of August, 1909, may be referred to, but the Commissioner does not think it advisable to enter into greater detail lest he should thereby appear to be hampering designers.

The Commissioner invites the co-operation of manufacturers in designing and contructing vehicles which can operate in the streets without affording ground for complaints. Any representations that may be put forward will, of course, receive the most careful attention.

THE COLLECTION OF FARES.

The management of Liverpool Corporation Tramways are showing commendable strictness in enforcing the by-law which places the onus of payment of fares upon the passengers. In a recent prosecution the defendant pleaded that she was not asked for the fare, and that she was so interested in a neighbour's conversation that she stepped off the car with the fare in her hand. An inspector who was travelling in plain clothes testified that the conductor had been twice in the car and collected two fares—one from a woman seated alongside and one from another opposite the defendant. A fine of 10s. was imposed.

Alderman Martin, chairman of West Hartlepool Tramways Committee, informed the Council at their November meeting that complaints had been received of people travelling without paying their fares. He pointed out that it was their duty to tender the fare without being asked for it, and that if they slipped off without paying they were liable to prosecution.

At Dundee, the cars have been stopping at certain stations in order that fares may be collected. Replying to a statement that the practice led to delays, Mr. Peter Fisher, general manager, has informed the Tramways Committee that it was common talk since girl conductors had been employed that many people got off the cars without payment. Under Section 51 of the Tramways Act, any passenger leaving without paying, whether asked for the fare or not, was liable to a fine of 40s. "In England," he said, "they are prosecuting people for it, but we don't want to do that."

PARLIAMENTARY BILLS.

LONDON UNITED TRAMWAYS COMPANY, LIMITED.

The bill which the London Tramways Company intends to promote in the ensuing session embodies the following provisions :—

1. The amendment or repeal of the restrictions for charging fares.
2. The postponement of the dates at which the several portions of the undertaking become purchaseable by the local authorities.
3. The relief from the liability of wayleave payments which are made to certain local authorities.
4. The abandonment of portions of the Company's system.

Mr. James Devonshire, managing director of the company, in a letter to the local authorities concerned, explaining the position, points out that the revenue for many years past has been insufficient to permit of the necessary reserve being made for renewals. Since the outbreak of war operating expenses have increased so seriously that the company has found itself unable to meet the payment of interest on its debenture capital, with the result that a receiver was appointed. Owing to the impossibility of securing supplies the rate of deterioration of the property has been greatly accelerated. Immediately circumstances permit, extensive repairs and renewals must be carried out. The directors have given the matter close attention, and they are convinced that it would be impossible to raise the money required unless the Company is in a position to offer adequate security for a reasonable return on the capital invested. For this purpose it will be necessary to improve the position of the company's tenure of the undertaking by extinguishing the wayleave payments and doing away with unremunerative fares, so as to increase its gross revenue.

SHEFFIELD CORPORATION TRAMWAYS AND OMNIBUSES.

This Bill seeks powers to construct tramways from Firth Park terminus to Ecclesfield, and from Woodseats terminus to Dronfield ; and also to run motor omnibuses to (1) Ecclesfield, Chapeltown, and High Green (being a continuation of the Firth Park Ecclesfield route). (2) Chapeltown to Burncross and Grenoside. (3) Tinsley to Catcliffe and Treeton. (4) From the City boundary in Loppings Lane to the junction of Loppings Lane and Penistone Road ; and (5) from Mosborough to Eckington as a continuation of the Intake to Mosborough route.

A PORTSMOUTH IMPROVEMENT.

LOADING PLATFORMS FOR TRAMWAY PASSENGERS.

An improvement that will add to the efficient working of the Cosham Junction route of Portsmouth Corporation Tramways, and to the convenience and comfort of passengers, will shortly be carried out. Land is to be acquired with a frontage to London Road of approximately 252 feet, and a depth adjoining the railway of 190 feet, upon which site lines will be constructed to avoid congestion of traffic, and at the same time facilitate the loading and unloading of the tramcars. A sum of £800 has been paid for the land. Councillor J. Simpson, chairman of the Tramways Committee, at a recent meeting of the Corporation, stated that it was proposed to construct a circular line for the cars to run in on, and there would be platforms on a level with the steps of the cars. Passengers would be discharged on one side, and the cars would run round and pick up on the other side. From the public footpath there would be covered gangways to the platforms. Unanimous assent was given by the Corporation to the purchase of the land. Councillor Spickernell asked if there was any possibility of purchasing the Horndean Light Railway, because there was every prospect of the Corporation lines having to be extended on the right and left so as to serve Drayton and Porchester. The chairman of the Tramways Committee declined to express any opinion on the suggestion.

MISCELLANEOUS NEWS AND NOTES.

Power Costs at Peterborough.—Peterborough Electric Traction Company will be required to pay 20 per cent. extra for electrical energy, the same as other power consumers.

Fare Question at Manchester.—A special meeting of the Manchester Tramways Committee has been summoned for Tuesday to consider the question of increased tramway fares.

Tramways and Air Raids.—West Hartlepool Tramways Committee have decided, owing to mechanical reasons, that when the first air raid warning is given the cars shall be ordered back to the depots.

Free Riding for Wounded Soldiers.—At Sunderland, wounded soldiers wearing hospital dress are permitted to ride free of charge on the tramways between the hours of 10 a.m. and noon and 2 p.m. to 5 p.m.

Gas Supplies for Motor Vehicles.—Glasgow Gas Committee have made arrangements for apparatus to be fitted on four of their premises for the filling of gas containers on motor vehicles. Gas will be supplied at the rate of 4d. per 100-cubic feet.

Extensions at Derby.—The Tramways Committee have recommended that applications should be made to the Local Government Board for a further extension of one year for the carrying out of the tramway work authorised by the Corporation Act, 1913.

Bradford Parcels Delivery.—In view of the proposal to establish a parcels delivery system at Hull, the Tramways Committee recently sent a deputation to study the parcels delivery system which was instituted by Bradford Corporation Tramways some years ago.

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Paving of an Omnibus Route.—During the past year Manchester Paving Committee have substituted granited rock asphalte for tar macadam on a portion of Palatine Road, in order to meet the wear entailed by the motor omnibus traffic of the Tramways Department.

Woman Conductor Rewarded.—Newport Tramways Committee have promoted a woman conductor to first-class, with an increase of half-a-crown in wages, for utilising the sand box on a Stow Hill car that began to run backwards on greasy rails, thereby bringing the car to a standstill.

No Christmas Traffic at Birmingham.—In view of the war conditions, and after considering a letter from the Amalgamated Society of Tramway and Vehicle Workers, the Birmingham Tramways Committee have decided that no tram cars or omnibuses shall be run on Christmas Day.

Torquay Tramway Fares.—At a recent meeting of the Torquay Town Council with reference to increased tramway fares and the overcrowding of cars, the Council came to the conclusion that there was reasonable ground for the action of the Company in raising the penny fares to three-halfpence, and that there was no real cause for complaint of overcrowding.

Price of Coal at Walsall.—Walsall Electricity Committee have protested to the Coal Controller against the increased price of coal being made retrospective to September 17. It was stated by Alderman Cope, chairman of the Tramways Committee, that if the extra expense is continued, the Tramways Committee will have to ask for an increase in fares.

Municipal Use of Petrol.—Replying to a request from the Petrol Executive to economise petrol as far as possible and to use gas, the Sheffield city surveyor stated that there is difficulty in obtaining a proper supply of gas. The Executive have informed Mr. Hadfield that they expect to be able to make effective representations as to additional labour for the Gas Company.

Accident at Gateshead.—An alarming accident occurred at Gateshead last week, when a car that had got beyond control left the rails at the junction of Walker Terrace and West Street, and ran into the Old Mill Inn. The driver stuck to his post until the car came to a standstill. None of the passengers was injured, and the car was extricated from the wreckage within an hour.

Demonstration of Farm Tractors.—In a field adjoining the Austin Company's Works, on November 22 and 23, there will be a demonstration of farm tractors and turn ploughs, and the machines will drive other agricultural machinery on the land, chaff cutters, threshing machines, corn crushers, etc. It is intended that the demonstration shall be the most complete of its kind yet offered to the public as an opportunity of judging the merits of these machines for general farm purposes. Tickets may be obtained from the Tractor Department, Austin Motor Co., Ltd., Northfield, Birmingham.

Paisley Tramways War Service.—The work of the Paisley Tramways Company in providing transport for munition workers has received recognition not only from military tribunals, but from the Ministry of Munitions. Mr. F. Coutts, the general manager, and his staff, have made every endeavour to provide the fullest possible service. For four hours in the morning, starting from 4.30, cars are run exclusively for persons engaged in munition works and controlled establishments, and several hours are devoted to the same workers in the afternoon and evening. At least 70 per cent. of the passengers carried daily are munition workers.

Damages Against South Shields Corporation.—On November 9, a Newcastle Assize jury awarded £600 to a wagoner who brought an action against South Shields Corporation for damages for personal injuries, alleged to have been caused through the negligence of a tramcar driver. Plaintiff, it was stated, was going down Station Bank with a four-wheeled wagon. He was walking on the pavement holding the reins to steady the horse when a car coming behind ran into him. He was pulled underneath the wagon and injured. The Corporation had paid £150 into Court, and applied for a stay of execution, having regard to the amount of damages. The Judge, in granting the application, remarked that by doing so he did not wish to encourage the Corporation in an appeal.

Advisory Committee on Labour Problems at Leeds.—On November 9, Leeds Corporation appointed an Advisory Committee to assist the Council in connection with matters arising out of the relationship between that authority and their employees. The Committee is constituted as follows:—Aldermen C. H. Wilson and R. A. Smithson (chairman of the Tramways Committee), and Councillors R. H. Blackburn, Hunter, Eddison, Dixon, and Gibson (representing the Council); Mr. John Cliff, Mr. A. Wells, and Mr. H. E. Clay (Tramway Workers' Union); Councillor Robinson (Enginemen and Boilermakers), and Mr. T. Leary, Mr. R. Willans and Councillor Wood (Gasworkers). Alderman Wilson stated that the representatives of the Unions had agreed to give the scheme a trial. The Council could not delegate any powers to the Committee, but scores of questions could be discussed amicably, and the path made smooth for a final settlement.

Women Drivers at Ayr.—The annual report of the manager of Ayr Corporation Tramways states that the number of accidents was 22, as compared with 16 the previous year. This is very gratifying in view of the lighting restrictions, and that the majority of the drivers were females. These were factors calculated to increase the risks of accidents, but none of the accidents could be attributed to either cause. The female drivers have done extremely well, and upon three occasions have averted accidents by their coolness and promptitude. The consumption of electrical energy showed a decrease of 3,816 units, but in view of the decrease of 28,764 in the number of car miles the consumption should have been considerably lower. The upward tendency can only be accounted for by the introduction of the female drivers, the necessary training required, and the first complete year's working of the top covered cars. The consumption was equal to 1·08 units per car mile, as against 1·02 for the previous year.

Belfast Tramways Dispute.—Arbitration proceedings in the dispute as to wages and conditions between the Belfast Corporation and its tramway employees and overhead equipment men took place before the Committee on Production at Westminster on November 9. The men applied for an increase in wages of 3s. a week, thus bringing them into line with the power station men, together with payment at the rate of time and a half after sixty hours. The men employed on overhead equipment work asked the Committee to determine the conditions of their employment, alleging that the Corporation were endeavouring to regard them as handy men instead of skilled electricians. The proceedings were taken in private and the cases were separately considered. Belfast Corporation was represented by Mr. J. Tyrrell, Chairman of the Tramways Committee, Mr. J. S. D. Moffet, general manager of the tramways, and Mr. J. McCormick, solicitor. Sir George Gibb, who presided, intimated that the decision would be communicated in the course of a few days.

Yorkshire Tramway Managers.—A meeting of Yorkshire tramway managers was held in Sheffield on November 8. The members lunched together at the Grand Hotel, and afterwards adjourned to the Tramway Offices. Mr. A. R. Fearnley was in the chair, and the following members were present:—Messrs. R. H. Wilkinson (Huddersfield), J. D. Caird (Halifax), J. W. Galloway (Halifax), E. A. Paris (Liversedge), C. J. Jewell (Wakefield), H. L. White (Grimsby), J. Parkinson (Liversedge), W. J. McCombe (Hull), J. Brown (Mexborough), H. England (Wakefield), R. L. Acland (Chesterfield), and W. J. McGibbon (Ossett). The Secretary (Mr. H. England) read the records of the previous meeting held in Leeds, and presented a balance sheet which showed a sum of £1 2s. in hand on the year's working. A lively discussion followed on many subjects of general interest to managers, amongst others being:—The lighting of cars, the question of total cessation of tramway traffic on Christmas Day, women inspectors, volunteer drivers, etc., A hearty vote of thanks was accorded to Mr. Fearnley for presiding.

"Keep to the Left."—In accordance with a resolution passed at the Municipal Tramway Conference in September, the Home Secretary will be petitioned by the Municipal Tramways Association in favour of a reversal of the present rule of the footpath by which pedestrians "keep to the right." The London Safety First Council, which a few months ago started a campaign in favour of the reform, says that the present practice is the cause of a large number of fatal accidents. The effect of the general adoption of a "Keep to the Left" rule would be that pedestrians would always face approaching traffic, and the accidents that ensue from the practice of stepping on to the road from the near side footway, in front of over-taking vehicles, would be reduced to a minimum. The old rule "Keep to the Right" appears to have no legislative sanction, but has become a partially observed custom with official approval. It is suggested that a by-law might be framed to deal with the matter. Of the 28 London Borough Councils, 20 have expressed themselves in favour of the change, and, outside the county area, Barnes, Beckenham, Dartford, Ealing, East Ham, Hornsey, Leyton, Richmond, Surbiton, Walthamstow, and Willesden are amongst the local authorities which would welcome official action on the lines suggested. It is reported that Ayr has adopted the proposal, and that Glasgow, Manchester, Birmingham and other large cities have it under consideration.

PERSONAL.

Councillor W. Evans, J.P., the new mayor of Newport, has been a member of the Tramways Committee.

Mr. Harrison Barrow has been re-elected chairman of the Birmingham Corporation Tramways Committee for the eleventh time.

Sergt. J. J. Clear, late of Liverpool Tramways department, at the Green Lane depot, has been awarded the Military Medal for bravery in the attack on September 20.

Mr. Arthur T. Smith, engineer and manager of Leigh Corporation Electricity Works, has resigned his position to accept an appointment on the staff of British Dyes Ltd., Huddersfield.

Alderman R. A. Smithson, has been re-elected chairman of the Leeds Corporation Tramways Committee. With a brief intermission, Alderman Smithson has been chairman of the committee since 1895.

Lieut. E. Evans, R.G.A., has been appointed road transport officer under the Ministry of Food for South Wales and Monmouth. His duties are to carry out a scheme for the saving of both mechanical and horse transport.

Sir Albert Stanley has undertaken an important commercial mission to America in connection with the war. During his absence the Board of Trade will be placed in charge of Sir Gordon Hewart, the Solicitor-General.

Sir John Courtis, Chairman of Cardiff Tramways Committee and Development Committee, is interested in a new industry which is about to be started in that city. According to an announcement at the Lord Mayor's election, the industry will be of a new character and will involve the employment of many women, and also operatives in subsidiary trades.

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Mr. Stanley Saunders, chief clerk in the electricity department at Lincoln, is taking up a similar post at Salford. Mr. Stanley Clegg, electrical engineer, on behalf of the staff of the electricity and tramways department, has presented him with a watch.

Mr. Fred Bland, of Edgar Allen and Co., Ltd., Sheffield, on November 10 gave an illustrated lecture on "Thirty Years' Tramway Practice" to the members of Rotherham Technical Institute Engineering Society. He described the process of manufacture of a tramway point and the evolution of points and crossings.

Mr. J. B. Hamilton, general manager of Leeds Corporation Tramways, has been appointed chairman of the Executive Council of the Municipal Tramways Association for the ensuing year. The appointment has been made under the new clause in the articles of association adopted at the Conference at Blackpool, which enables the Executive to appoint a chairman to preside at all meetings at which he may be present.

Mr. E. L. Morgan, who, out of 49 candidates, has been appointed city engineer and surveyor of Cardiff, has since 1900 been borough engineer and surveyor of Bolton. Previously he was deputy engineer at St. Helens, and from 1889 to 1891 he filled the post of resident engineer of the Great Southern of Spain Railway. Mr. Morgan has been responsible for the construction of railways, tramways and bridges in his wide range of engineering experience.

Keeping Places Open.—A correspondence is in progress in *The Times* on the subject of employers failing to keep open the places of men who are serving with the Forces. Sergt. W. M. Ronaldson, of the Motor Transport, A.S.C., Woolwich, has forwarded a letter from the Falkirk and District Tramways Company, stating that his position of traffic superintendent can no longer be kept open, and that all arrangements come to when he applied for leave of absence in August, 1915, must now be considered cancelled. As there are no signs of the war coming to an end, the directors consider that a permanent appointment will require to be made.

CONTRACTS AND ORDERS.

Sydney Municipal Council have accepted the tender of Messrs. W. Adams and Company at £6,182 for the supply of boosting plant for Castlereagh Street sub-station.

Huddersfield Town Council have decided to enter into a contract with the Woods-Gilbert (British) Rail Grinding and Milling Company, Ltd., for the grinding and milling of some sections of the track which are badly in need of repair. It is anticipated that the use of the Woods-Gilbert system will prolong the life of the rails from five to seven years.

FINANCIAL REPORTS AND MEETINGS.

United Electric Tramways of Caracas, Ltd.—A dividend of 7 per cent., less income tax, for the last financial year has been declared.

The Electric Construction Company have declared a dividend at the rate of 6 per cent. per annum on the ordinary shares, less income-tax, for the year ended March 31, 1917.

German War Loan.—It is reported that the A. E. G. of Berlin has subscribed £500,000 to the seventh German war loan, and Felten and Guilleaume, of Carlswerk, £200,000.

R. E. T. Construction Company, Ltd.—Creditors must send particulars of their debts, etc., to the liquidator, Mr. A. Page, 28, King Street, Cheapside, London, E.C., not later than November 30.

Stirling and Bridge of Allan Tramways.—The accounts for the year ended August 31 last shows total earnings £5,408. The expenditure was £5,536, making a total increase of expenditure for the past three years of £1,608 11s. The net result shows a loss of £128 during the year, which being added to the debit balance brought forward leaves a sum at debit of revenue of £325.

Birmingham Railway Carriage Company.—The Directors of the Birmingham Railway Carriage and Wagon Company have proposed to sub-divide the shares and to give the ordinary shareholders one new £10 share for every two shares now held. For this purpose £168,695 will be taken from the internal reserve. In October, 1915, a 50 per cent. bonus in shares was given, £383,491 of the reserve fund being capitalised.

L.C.C Traffic Receipts.—The traffic receipts for the week ended November 14 amounted to £55,476 an increase of £8,120 as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to November 14 (thirty-two and a half weeks) the total receipts were £1,813,894, an increase of £225,128 on the corresponding period of 1916.

Auckland Electric Tramways.—For the year ended June 30, 1917, the total revenue was £286,885. Traffic receipts were £282,697, an increase of £7,914. After providing for all expenses chargeable to revenue, including £20,801 for debenture and other interest, and £5,401 payable to Auckland City, and setting aside £25,000 to renewals and depreciation, there is a surplus of £55,316, making, with £4,600 brought forward, a total of £59,917. The directors now recommend that £10,000 be transferred to reserve, bringing that account to £142,500, and that a further dividend be paid on the ordinary shares of 1s. per share, less income-tax, making 1s. 7d. for the year. This will leave £5,292 to be carried forward. Under the trust deed, £8,486 first mortgage debenture stock was cancelled, the average cost to the company being 93¼ per cent. Capital expenditure during the year amounted to £9,545.

Record Year at Ayr.—Mr. W. Grant, general manager of the Corporation Tramways, reports that for the year ended May 15 last the total revenue amounted to £21,074 compared with £19,285, showing an increase of £1,789. The traffic receipts alone constitute a record, amounting to £19,756, against £18,377, an increase of £1,379. The receipts per car mile work out at 11·79d., as against 9·62d. The number of passengers was 4,596,906, compared with 4,352,113, an increase of 244,793. The number of miles run was 428,739, as against 457,503, a decrease of 28,764. This is accounted for by the fact that the winter service was continued throughout the summer, only occasional extra cars being run as required. The working expenses, exclusive of power charges, amount to £9,609, or 5·37d. per car mile, and including power costs the total working expenses for the year amount to £12,842, or 7·18 per car mile. This shows a percentage of working expenses to receipts of 60 per cent. The charge for energy supplied to the tramways was increased by 10 per cent., making a total increase of 25 per cent. since 1915.

Newcastle Tramways Successful Year.—The annual report of the engineer and general manager (Mr. Ernest Hatton) of the Newcastle Corporation Tramways and Electricity Department for the year ended March 31, 1917, shows that the traffic revenue for the year was £346,334, as compared with £314,732 for the previous year, while the total revenue amounted to £356,534, as compared with £324,694. Working expenses aggregated £208,299, the balance of profit being £148,235. Adding interest on investments, £6,383, there is a total of £154,619, as compared with £135,764 in the previous year. After payment of interest, sinking fund and other charges, there is a balance of £62,902, as compared with £44,858. It is proposed to appropriate the balance as follows:—Income tax, £15,845; contribution in aid of rates, £7,000; insurance reserve, £2,065; and renewals fund, £37,992. The passengers carried numbered 78,189,246, an increase of 5,437,615 over 1915-16, and over 13 millions above that of 1914-15. Traffic expenses are £24,000 higher than in 1914-15. The only reduction in expenditure is that for local rates, which followed the extended negotiations and litigation with the Poor Law authorities, and resulted in an approximate reduction of £8,000. The City Council have decided to make a contribution to the rates from the tramway revenue of £7,000. The tramway manager refers to the growing demand for increased services of cars for workmen, and says that while every effort has been made to cope with this demand, in view of the limitations placed on the system by Government departments, it is impossible to do much more. As showing the efforts that have been made to meet the requirements of workpeople, it is stated that something like 380 car loads, averaging 100 passengers per car, are dealt with daily.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended November 3 give total receipts of £192,713 or £25,343 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £94 19s. 7d. per mile of single track, and last year at the rate of £82 9s. 9d., thus showing an increase for the week of £12 9s. 10d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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SHIFT ENGINEER WANTED.

Shift Engineer wanted in a Certified Undertaking, accustomed to turbo-alternators and water-tube boilers, A.C., three-phase and D.C. supply. Salary £2 10s. per week.

Apply stating age, experience, and enclosing copies of testimonials to—

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends Prev.	Dividends Last.	Name.	Paid.	Price, July 27, 1914.	Cash Nov. 15 or previous.	A Week Ago.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	71½	72
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4¼	60/-	60/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	50	50/-
4%	4%	Do. 4% Deb.	100	91	69½	69½
4½%	4½%	Do. 4½% Deb.	100	108½	71½	72½
5%	5%	Do. 5% Deb.	100	106	67½	67½
—	—	Associated Omnibus Co., Ord. ..	5/-	—	20/3	20/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1½	90	90
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	—	103½
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	104½	4/-
—	1/-	Bath Electric Trams Pref. Ord.	1	½	10/6	10/6
6d.	6d.	Do. 5% Cum. Pref.	1	—	71½	71½
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	80/-	80/-
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11½	9½	9½
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	42	43½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	90½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	28	27
6%	5%	Do. Pref. Ord.	100	106	29	30
5%	5%	Do. 5% Cum. Pref. ..	100	103	42½	42½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	82½	83
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	55½	54
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	32	32½
6%	6%	Do. 6% Cum. Part. Pref.	100	—	74½	74½
5%	5%	Do. 5% Deb.	100	92	75	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	71½	71½
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	6⅝	7⅛
2/6	2/6	Do. 5% Cum. Pref. ..	5	5⅛	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	71½	71½
1/-*	1/-*	Cape Elec. Trams.	1	⅛	11/-	11/-
1/3	1/3	City of B. A. Trams	5	5½	82/6	83/1½
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	81½	82½
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10⅝	10⅝
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	½	1/3	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	½	10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	⅝	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2¼	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅛	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9⅛	9⅛
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	70
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9¾d.*	9¾d.*	Llandudno & Colwyn B. Ord. ..	1	—	10/-	10/-
—	1¾d.	London & Sub. Traction Ord. ..	1	⅛	2/10	2/10½
6d.	6d.	Do. 5% Pref.	1	1/16	7/4½	7/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	62½	61
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81½	80
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	78
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	35½	35
3/-	3/-	Madras Elec. 6% Pref. ..	5	5⅛	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9½d.*	Manaos Trams & Ltg. Ord. ..	1	⅜	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	70½	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1½	$1½	Mexico Trams. Common ..	$100	70	32½	33½
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds.	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	88½	88½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	⅛	20/-	19/7½
9½d.*	9½d.*	New General Traction	1	¼	7/3	7/3
8½d.	6d.	Northern Gen. Trans. Ord. ..	1	⅛	12/9½	13/-
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	80/3	80/3
5%	5%	Do. 5% 1st Deb.	100	89½	74½	77
—	—	Pernambuco Tram. & Power Ord	1	—	6/9	7/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	13/-	12/9
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	⅛	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	⅛	11/-	10/9
1/4	8d.	Provincial Trams. Ord.	1	¼	19/9	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	75	76
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74	75
12/-	10/-	Shanghai Elec. Cons.	10	13	14½	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	½	4/6	4/6
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77½	77½
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	67½
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	⅛	84/7½	82/6
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	15½	16
—	—	Undgd. Elec. Rys. of London ..	10	21½	36/3	35/-
		Do. "A"	1/-	¾	5/7½	6/-
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	103½	103
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	103	102
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	81½	81½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

Names.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Nov. 6	426	453	+ 27	31	13,641	+ 1,151
Aberdeen Corporation ..	,, 7	1,958	2,205	+ 247	23	50,502	+ 5,615
Ayr Corporation	,, 10	271	341	+ 69	26	13,803	+ 1,354
Belfast City	,, 9	5,679	7,089	+ 1,410	32	204,835	+ 22,196
Birkenhead Corporation ..	,, 11	1,546	1,845	+ 299	32½	59,239	+ 8,791
Birmingham Corporation ..	,, 3	14,375	19,424	+ 5,049	31	566,579	+ 56,179
do. Motor Omnibuses ..	,, 3	1,014	1,197	+ 183	31	32,129	+ 804
Blackburn Corporation ..	,, 7	1,108	1,366	+ 258	32½	49,210	+ 7,426
Blackpool & Fleetwood ..	,, 10	345	424	+ 79	44	41,244	+ 415
Bournemouth Corporation ..	,, 14	2,082	2,259	+ 177	32½	86,111	+ 6,688
Bradford Corporation ..	,, 10	6,223	8,097	+ 1,874	32	249,267	+ 25,714
Bristol	,, 9	4,704	5,777	+ 1,073	45	244,438	+ 22,581
Burnley Corporation ..	,, 10	1,574	1,841	+ 267	..	..	..
Burton-on-Trent Cor. ..	,, 11	272	329	+ 57	32	9,992	+ 927
Bury Corporation	,, 11	1,313	1,549	+ 236	32½	54,213	+ 6,545
Chatham & District ..	,, 8	1,179	1,184	+ 5	45	57,718	+ 1,896
Cork Electric	,, 8	493	556	+ 63	45	24,802	+ 1,682
Derby Corporation ..	,, 10	1,134	1,235	+ 101	32	39,076	+ 1,639
Dublin United	,, 9	6,040	6,802	+ 762	45	302,440	+ 28,735
Dundee City	,, 7	1,363	1,504	+ 141	25½	1,504	+ 3,574
East Ham Corporation ..	,, 10	1,227	1,328	+ 101	32	45,299	+ 2,642
Exeter Corporation ..	,, 9	389	388	— 1	32	13,230	— 67
Glasgow Corporation ..	,, 10	23,694	26,916	+ 3,222	23½	618,299	+ 70,243
Glossop (U.E. Sup. Co.) ..	,, 10	139	175	+ 36	45	6,935	+ 659
Halifax Corporation ..	,, 6	2,021	2,235	+ 214	31½	79,887	+ 6,563
do. Motor Buses ..	,, 6	49	49	nil	31½	1,545	— 59
Hastings and District ..	,, 11	829	1,092	+ 263	45	56,685	+ 8,929
Huddersfield Corporation ..	,, 11	2,668	3,143	+ 475	32	103,488	+ 10,171
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,662
Ilford U.D. Council ..	Nov. 10	640	726	+ 86	32	24,808	+ 2,486
Ipswich Corporation ..	,, 10	421	569	+ 148	32	22,580	+ 5,185
Isle of Thanet	,, 10	279	160	— 119	6	1,025	— 765
Kilmarnock Corporation ..	,, 10	172	213	+ 41	25½	5,093	+ 498
Lanarkshire	,, 8	2,267	2,848	+ 581	45	124,535	+ 20,040
Lancashire United ..	,, 7	1,821	2,466	+ 645	45	105,670	+ 23,177
Leeds City	,, 10	9,417	10,922	+ 1,505	32	355,510	+ 36,502
Leicester Corporation ..	,, 3	3,435	3,864	+ 429	..	..	..
Leith Corporation ..	,, 10	846	1,052	+ 206	25½	27,863	+ 4,913
Leyton U.D. Council ..	,, 8	1,503	1,772	+ 269	32	66,853	+ 6,414
Liverpool Corporation ..	,, 11	14,230	16,384	+ 2,154	44½	698,783	+ 63,544
Llandudno & Colwyn Bay	,, 2	221	253	+ 32	48½	17,108	— 870
London County Council	,, 14	47,256	55,476	+ 8,120	32½	1,813,894	+ 225,128
Maidstone Corporation ..	,, 8	197	221	+ 24	32	7,970	+ 735
Manchester Corporation	,, 10	18,514	21,096	+ 2,582	32	663,338	+ 52,974
Nelson Corporation ..	,, 10	185	223	+ 38	32	7,612	+ 619
Newcastle-on-Tyne Cor.	,, 10	6,918	8,022	+ 1,104	32	251,887	+ 35,966
New St. Helens & Dist. ..	,, 7	1,049	1,233	+ 184	19	28,668	+ 7,032
Northampton Cor. ..	,, 9	739	844	+ 105	32	26,935	+ 3,783
Nottingham Corporation	,, 8	3,904	4,599	+ 695	32	141,426	+ 14,154
Oldham Corporation ..	,, 11	2,294	2,740	+ 446	33	94,344	+ 10,996
Portsmouth Corporation	,, 10	2,335	2,540	+ 205	..	..	..
Provincial	,, 10	1,986	2,326	+ 340	5½	13,778	+ 1,218
Reading Corporation ..	,, 8	850	1,097	+ 247	32½	33,934	+ 5,810
Rhondda Tramways ..	,, 11	1,337	1,610	+ 273	44	66,002	+ 9,298
Rotherham Corporation	,, 14	1,654	1,855	+ 201	32½	58,905	+ 7,774
Salford Corporation ..	,, 12	5,370	6,458	+ 1,088	32½	214,501	+ 34,424
Sheffield Corporation ..	,, 11	10,849	12,320	+ 1,471	33	396,233	+ 46,261
Southampton Cor. ..	,, 7	1,676	2,133	+ 457	31⅛	65,383	+ 11,008
Southend-on-Sea Cor. ..	Oct. 31	699	583	— 116	31	30,698	— 919
South Shields Cor. ..	,, 13	854	926	+ 72	15	27,042	+ 3,009
Sunderland Corporation.	Nov. 11	1,631	1,807	+ 176	32	58,936	+ 5,198
Sunderland District ..	Oct. 31	647	812	+ 165	1	812	+ 165
Swindon Corporation	Nov. 7	196	257	+ 61	31½	8,699	+ 2,068
Torquay Tramways ..	,, 1	499	678	+ 179	44	29,440	+ 2,673
Tyneside Trys. & Trmrds.	Oct. 24	610	787	+ 177	17	11,858	+ 3,575
Wallasey Corporation .	Nov. 10	1,197	1,430	+ 233	32½	52,127	+ 6,177
Walsall Corporation ..	,, 10	808	1,020	+ 112	32	31,477	+ 4,231
Walthamstow U.D. Coun.	,, 10	955	1,136	+ 181	32	40,366	+ 4,054
Warrington Corporation	Oct. 25	509	570	+ 61	30	16,209	+ 1,315
West Ham Corporation	Nov. 8	3,027	3,542	+ 515	31½	117,243	+ 12,375
Wigan Corporation ..	,, 8	1,729	2,133	+ 404	32	63,629	+ 9,149
Yorkshire (West Riding)	,, 11	1,886	2,311	+ 425	45	95,676	+ 16,206

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Nov. 11	£52,460	£55,395	45	£2,329,964	+ £33,941
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo ..	July 15	2,704	2,593	16	13,044	— 35
Brazilian Traction (Mlrs.)	Sept.	7,138,000	7,425,000	39	68,430,000	+ 5,279,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Sept.	414,811	457,709	13	1,350,512	+ 100,116
Buenos Aires Lacroze ..	Oct.	39,670	39,067	17	149,879	— 1,737
Burmah Tram. & Light Rs.	Oct.	29,768	28,955	13	81,837	+ 3,907
Calcutta .. .. Rs.	Nov. 10	67,534	65,348	45	3,061,100	+ 13,394
Cape Town	Aug.	13,391	15,480	8	31,547	+ 4,796
Carthagena and Herrerias	Oct.	2,539	2,805	43	41,210	+ 16,071
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Oct.	2,080	1,229	13	4,303	— 2,822
Hong Kong .. .. $	Sept. 15	16,525	13,817	37	499,566	— 41,661
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Oct.	4,434	4,069	43	40,615	— 1,441
Lima	Sept.	33,340	35,621	39	322,195	+ 18,107
Lisbon .. .. Escu	Sept.	194,276	228,097	..	..	..
Madras .. .. Rs.	Oct. 31	31,810	35,418	43	696,215	+ 32,305
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	Aug.	147,774	150,657	..	..	..
Montevideo	Oct.	28,729	30,153	52	359,832	+ 12,090
Pernambuco	Nov. 4	3,453	4,313	43	167,483	+ 33,495
Peruvian .. .. $	Oct.	945,590	1,047,220	17	3,952,390	+ 363,560
Port Elizabeth	Aug.	2,863	3,360	8	6,904	+ 875
Rangoon	Oct.	5,043	5,667	43	50,021	+ 3,650
Shanghai .. .. $	Aug. 22	21,712	22,360	..	..	..
Singapore .. .. $	Sept. 29	12,989	13,016	39	503,884	+ 13,383
Toronto .. .. $	Sept.	913,535	1,023,517	39	8,891,112	+ 885,348
Winnipeg .. .. $	Sept.	267,497	207,170	39	2,431,794	— 29,660

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery and erection of Three Fan Draught Cooling Towers, at Stuart Street Station.

Specification, drawings and form of tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Engineer and Manager, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Wednesday, December 12, 1917.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
November 9, 1917.

CITY OF CARLISLE.

Electricity Department.

The Corporation of Carlisle invite tenders for the supply, delivery and erection of the following plant:—

1. One 1,500/2,000 kw. High-Pressure Turbo-Alternator.
2. One Surface Condensing Plant for above Turbo-Alternator.

Specification, with general conditions and form of tender, may be obtained from the undersigned at the Electricity Offices, Victoria Viaduct, Carlisle, upon payment of a deposit of Two Guineas for each section, which will be returned after the tenders have been adjudicated upon, provided a *bona-fide* tender is sent in by the date specified and not withdrawn. Extra copies of each specification may be obtained at the sum of 5s., which is not returnable.

Tenders, properly endorsed and sealed with wax, to be sent to the undersigned not later than 9 a.m. on Tuesday, December 4, 1917.

The contracts are subject to the sanction of the Local Government Board, and the Corporation do not bind themselves to accept the lowest or any tender, nor will the Corporation pay any cost incurred in tendering.

FREDK. W. PURSE, M.I.E.E., M.I.MECH.E.,
City Electrical Engineer.

Electricity Offices,
Victoria Viaduct, Carlisle.
November 9, 1917.

PATENT FOR PREVENTING CORRUGATION.

The Owner of British Patent No. 23,859 of 1911 for "Improvements in Rails, especially Tramway Rails, for preventing the formation of Corrugations," is desirous of arranging, by Licence or otherwise, on reasonable terms, the manufacture and commercial development of the invention in this country.—For particulars, address HERBERT HADDAN & Co., Chartered Patent Agents, 31 and 32, Bedford Street, Strand, London, W.C.2.

THE BARRY RAILWAY COMPANY.

The Barry Railway Company are prepared to receive tenders for the supply of General Stores and Materials, including Iron, Oils, Steel, Timber, Varnishes, Waste, Wire Ropes, etc., etc., for Six Months from January 1, 1918.

Specification, with Form of Tender, may be obtained from the undersigned.

Applicants are requested to particularise the Stores for which they wish to Tender.

After forms have been obtained, Samples and Patterns can be seen between the hours of 10 a.m. and 4 p.m. (Saturdays from 10 a.m. to 12 noon) at the Storekeeper's Office, Broad Street, Barry.

Sealed Tenders, endorsed "Tender for——," to be in the hands of the undersigned not later than 10 a.m. on November 27, 1917.

The Company do not bind themselves to accept the lowest or any Tender.

E. T. LAWRENCE,
Secretary.

Company's Offices,
Barry Docks, Glam.,
November 6, 1917.

POSITIONS VACANT.

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPARTMENT.

Appointment of Secretary.

Applications are invited for the position of Secretary in the Corporation Electric Supply Department.

Applicants should have had a sound commercial training in some large mercantile, manufacturing, or electric supply undertaking, and should possess a certain amount of technical knowledge in connection with electric supply business.

The salary will be at the rate of Eight Hundred Pounds per annum.

The successful candidate will be required to contribute to the Corporation Superannuation Scheme.

Forms of application for the above appointment and particulars of duties may be obtained from the undersigned, and should be sent, accompanied by copies of not more than three testimonials addressed to the Chairman, the Electric Supply Committee, 14, Dale End, Birmingnam.

Each application must be endorsed on the envelope "Appointment of Secretary," and must reach this office not later than noon, November 26, 1917.

HOWARD FOULDS,
Secretary.

14, Dale End, Birmingham.
November 12, 1917.

COUNTY BOROUGH OF OLDHAM.

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The Oldham Corporation Electricity Committee invite applications for the position of Shift Engineer, in charge of an eight-hour shift. Weekly wage £2 10s., and war bonus (12s.).

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Canvassing will be a disqualification.

J. H. HALLSWORTH,
Town Clerk.

Oldham,
November 21, 1917.

ASSISTANT SHIFT ENGINEER WANTED.

Must have had mechanical training and experience of E.H.T. power station. Wages 51s. 10d. per week.

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THE
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Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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SATURDAY, NOVEMBER 24, 1917.

WOMEN EMPLOYEES AND NATIONAL SERVICE.

Considerable difficulty is likely to be created for tramway managers by the new efforts to recruit a large number of women for the Women's Army Auxiliary Corps. We are in complete sympathy with the movement so far as the obtaining of the requisite labour for necessary work is concerned, but it appears that instead of encouraging those who have not hitherto engaged in war work to enter the labour field, the movement is likely to result in transferring women at present usefully employed to another, and in some cases less useful, channel. It would be well if strict instructions were laid down by the National Service Department to the effect that girls are not to be recruited for the Women's Army Auxiliary Corps who are at present, or have recently been, engaged in necessary public service ; for there is no national advantage to be gained in taking women from tramway employment and putting them on such work as, for example, aeroplane manufacture. To take an extreme case, if women conductors were drawn from a tramway performing necessary service for munition workers, the work over a large area would practically come to a standstill for lack of the necessary transport for the workers. It is by no means improbable that in many cases there would be a very large drain on women tramway employees when it is considered how much attraction a khaki uniform provides in comparison with a blue tunic and black gaiters. Even a tartan skirt, with which conductors of Scottish tramways are provided, is powerless against the attraction of khaki. Women tramway workers have been trained, and the majority of them are now fairly competent to perform their duties, and it would seem only reasonable that they should be encouraged to continue in the work for which they have with considerable difficulty fitted themselves rather than be taken away to some work for which another period of training would be necessary. Women conductors are told quite frankly, it is true, by local labour exchanges that they cannot leave the tramway service to join the Women's Auxiliary Corps, as they are doing as important, if not more important, work where they are ; but this does not in any way prevent them from leaving their positions, and after they have left applying to a local exchange in the same or another district for enrolment. The situation provides one of the difficulties with which the National Tramway Committee, it may be hoped, will deal as early as possible. Tramway managers have the utmost difficulty in keeping sufficient employees to maintain the necessary services, and if the Women's Army Auxiliary Corps becomes a competitor with them in the labour market it will be impossible for them not only to obtain new women employees but even to keep those they already have. Every day the necessities of tramways, both as respects labour and material, become more acute, and it is to be hoped that no time will be lost in completing the organisation of the Committee and making a careful investigation of the necessities of the tramway service. The Board of Trade are in possession of full information as to the essential service which is now being given by tramways all over the country in connection with munition work, and they must be convinced that every effort should be made to keep the cars running.

THE NATIONAL TRAMWAY COMMITTEE.

In our last issue we announced the appointment by the Board of Trade of a National Committee of Tramway Managers. As then stated, the Committee consists of the following :—

James Devonshire (chairman), managing director, London United Tramways, Ltd., the Metropolitan Electric Tramways, Ltd., etc.
A. L. C. Fell, general manager, London County Council tramways.
J. B. Hamilton, general manager, Leeds Corporation tramways.
J. M. McElroy, general manager, Manchester Corporation tramways.
A. R. Fearnley, general manager, Sheffield Corporation tramways.
R. J. Howley, joint manager, British Electric Traction Company, Ltd.
Stephon Sellon, consulting electrical engineer.

For the information of the members of the Municipal Tramways Association, the following brief summary has been issued with reference to the negotiations which took place previous to the appointment of the Committee and to the decisions which were arrived at by the Executive Council in regard to the matter :—

"In response to the request of the President of the Board of Trade, the Council of the Municipal Tramways Association, together with the Council of the Tramways and Light Railways Association, attended at the Board of Trade on November 2, and met the President (Sir Albert Stanley), together with representatives of the Ministry of Munitions. The President made a short statement suggesting the advisability of the appointment of a Controller to deal with tramway matters, and stated that he had seen Mr. James Devonhsire, and that Mr. Devonshire had agreed to accept the position.

"The Executive Council of the Municipal Tramways Association pointed out, however, the serious objection which would arise by the appointment of a single Controller, as announced by the President, and they recommended to him the appointment of an Executive Board under the chairmanship of the gentleman already suggested as Controller.

"As a result of the conference which took place, the following letter was received from the Board of Trade :—

'November 10, 1917.

'SIR,—I am directed by the Board of Trade to state for the information of your Association, that the President of the Board has decided, in view of the serious difficulties under which tramways are at present labouring, to set up an expert Committee to consider the needs in respect of materials and labour of tramways essential to the prosecution of the war, and to take such steps as may be necessary to supply such needs even at some temporary sacrifice on the part of the less essential undertakings. The President is confident that he can rely on the assistance of your Association in this important matter, and he would be glad if the Municipal Tramways Association would be good enough to nominate at the earliest possible moment three representatives to serve on the Committee. I am to add that it is proposed that Mr. James Devonshire should be the Chairman of the Committee.—I am, Sir, your obedient servant, ERNEST J. MOGGRIDGE.'

"The Executive Council of the Municipal Tramways Association held a meeting in Manchester on Wednesday, the 14th instant, and

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nominated the following three gentlemen to serve on the Committee: Mr. J. B. Hamilton (Chairman of the Executive Council), Mr. J. M. McElroy (Past-President), and Mr. A. R. Fearnley (Hon. Secretary).

"The Committee therefore will now consist of the three representatives nominated by the Municipal Tramways Association, Mr. A. L. C. Fell, representing the London County Council Tramways (nominated by the Board of Trade), two members nominated by the Tramways and Light Railways Association, chiefly representing company-owned tramways, and the Chairman (Mr. James Devonshire), nominated by the Board of Trade.

"Up to the present we are informed that the question as to exactly what matters are to be referred to the Committee has not been settled.

"The President and the Executive Council requested me to give this early intimation setting out what had passed in regard to this question for the information of all the members of the Association and also to clearly point out to them the fact that the municipal interests which so largely predominate in tramways were being adequately safeguarded by the Executive Council.

"It should be noted that the composition of the Committee provides for four Municipal Tramways Association representatives and two Tramways and Light Railways Association representatives and the Chairman, so that no question is likely to arise regarding undue prominence being given to company interests to the detriment of municipal interests.

A. R. FEARNLEY, Hon. Secretary."

Division Street, Sheffield. November 15, 1917.

LONDON "SAFETY FIRST" COUNCIL.

A meeting of the London "Safety First" Council was held on Wednesday, November 21, in the Council Chamber of the Guildhall, Westminster. Mr. W. Joynson-Hicks, M.P., presided. It was reported that the Beckenham Urban District Council had joined the Council. Messrs. W. J. Pincombe, secretary of the London Teachers' Association, and C. W. Crook, B.A. B.Sc., ex-president of the National Union of Teachers, were co-opted as members of the Council.

The Drivers' Educational Committee reported that it had under consideration particulars, which had been submitted to it for criticism, of a "Safety" cradle for horseless vehicles; also, that it had given directions for the issue of a new poster, "Don'ts for Cyclists," and that later on the "Hints to Drivers" should be issued in the form of an illustrated poster. The Publicity Committee announced that, to meet the demand for the "Safety" poster for pedestrians, an additional 5,000 copies had been authorised.

The Publicity Committee reported that the promotion of the "Safety First" essay competition for children had been sanctioned by the London County Council and other education authorities in Greater London.

Upon the joint recommendation of the Street "Safety" and Publicity Committees, it was decided to ask certain local authorities again to consider the question in view of the consensus of opinion in favour of the "Keep to the Left of the Footpath" movement.

The Railway "Safety" Committee reported that, to meet the demand therefor, arrangements had been made for the supply of 10,000 copies each of two posters entitled "Safety: Advice for Railway Employees," and "Safety: Advice for Railway Travellers," and, in addition, a number of cards containing suggestions for the prevention of accidents in railway workshops.

THE MAKING OF A TRAMWAY POINT.

This is the title of a handsome book issued by Messrs. Edgar Allen and Co., Sheffield. Not only is it well printed and illustrated, but it conveys much information of great interest to every tramway manager and engineer. The introduction explains the exceptional qualities of manganese steel as to hardness, toughness, and so forth, and shows how well the metal is suited for tramway points and crossings which have to withstand such heavy wear and tear. The first half of the book consists of a series of illustrations showing every stage of the manufacture of a manganese steel tramway point, from the original drawing and the making of the wood pattern, through the processes of casting, dressing, grinding, and so forth, till the finished article is evolved. Of course, points made of manganese steel, like other articles constructed of that metal, are expensive as regards first cost, but this is more than compensated by their great durability. As is well known, the material is too hard to be machined, and has consequently to be ground. It is so tough that it may be bent double when cold without fracture. The tensile strength is over 55 tons per sq. in., and this steel stands twice the drop test required by the British standard specification.

The second part of the brochure consists of a *resumé* of a paper read before the Tramways and Light Railways Association at Blackpool, in July, 1913, by Mr. Fred. Bland, of Messrs. Edgar Allen and Co. This paper, which is called "1883 to 1913, or Thirty Years of Tramway Practice," is a valuable compendium of the development of tramway rails, points, and crossings. The drawings and half tone illustrations show the march of progress from the time of the light track of the horse-car days to the substantial construction now used for electric traction.

An interesting appendix to the book is a list of what are called "tramway firsts." It gives the dates when a great many things in connection with tramways first came into use or operation.

DEVELOPMENT PROPOSALS FOR BIRMINGHAM TRAMWAYS.

Councillor Harrison Barrow, Chairman of the Birmingham Tramways Committee, writing in the *Birmingham Gazette and Express* says that directly the war is over there are four things which should occupy the immediate attention of the Tramways Committee:—

1. The necessary repairs to the tramway tracks.
2. The provision of single-deck cars with trailers.
3. The construction of the lines authorised in the 1914 Act to show the advantages of the separate track.
4. The extension of the system of carrying heavy goods on the tramway system.

As regards single-deck cars with trailers, he thinks that they are less unsightly, cause less noise, and entail less wear and tear on the tracks and the cars. They would be available for use on the separate track, where it is doubtful if double-deck cars would be permitted to run. Considerable expense would be saved in energy consumption, owing to the possibility of discontinuing the trailer when traffic did not require its use. The disadvantages would be the capital cost of making the change and the provision of loop lines at all the termini. The two lines that Councillor Barrow thinks should be first constructed are those from Selly Oak to Rednal and from Salford Bridge to the Castle Bromwich Playing Grounds. These would prove the advantages of the separate track. The carrying of heavy goods and farm produce would obviously be a very great advantage to the community. The Birmingham tramways department is already carrying thousands of tons at extremely low cost. The Public Works Committee and other departments of the Corporation, by putting in a few sidings, could make use of this cheap transit. Arrangements could be made later with the larger works in the city. Councillor Barrow adds that a system of cheap and efficient transit is so essential to the progress of a great city that it is to be hoped the initiation of these improvements will be carried through with energy and despatch. The Chairman advocates a forward policy.

TRAFFIC CONTROL PROBLEMS.

The second of the current winter series of operating efficiency meetings connected with the London Underground Railways and the London General Omnibus Company was held at the L.G.O.C. training school, Millman's Street, Chelsea, on the 15th inst., Mr. H. E. Blain, operating manager, presiding over an attendance of about 150 of the control staffs.

A paper, "Some notes on Traffic Control Problems," was read by Mr. J. N. Cowderoy, chief clerk of the traffic research section. He made a critical review of methods of organisation adopted in connection with traffic control, both on surface and underground transit systems. The inevitable changes of method consequent upon the evolution of transit undertakings from one-man businesses to large organisations were alluded to. A plea was put forward for the continued recognition of the value of practical outside acquaintance with traffic conditions and requirements, and a change in road supervision from a district system to a route system, which, it was suggested would assist to the institution of more efficient time tables, more regular running, and a better road and staff control. The increasing difficulties in connection with time table preparation were alluded to and certain duty systems discussed. The writer deprecated the system of a permanent storm schedule for adoption in bad weather, as he considered that this was liable to turn a desirable individual dealing with such matters into a cast-iron system.

An interesting portion of the paper dealt with the traffic control system originally introduced on the railways, and now adapted, with a marked measure of success, to 'bus operation. On the railway side, a good knowledge by the underground railway staff of surface London was desirable, and the possibility of working night trains was discussed. Criticisms and suggestions with regard to non-stop running were included, as well as points in connection with indicator signs and the control of congested station platforms.

The paper was illustrated by a number of lantern slides, and at the conclusion it was subjected to some lively criticism, the speakers including Messrs. W. Nye, L.G.O.C. road superintendent; E. Evans, chief clerk, railway train running section; F. Eggington, superintendent of 'bus time schedules, and J. B. MacKinnon, traffic superintendent, London United Tramways.

Complaints Against Employees.—Replying to allegations against drivers and conductors, the employees' union at Oldham has informed Oldham Tramways Committee that they think such complaints should be made to the union officials in the first instance. Regarding the case in which a driver is alleged to have left his car after being spoken to for failing to stop, they, in effect, refuse to believe that such incident occurred. The chairman (Councillor Cheetham) said he got letters of complaint every week. A driver recently was seen to ignore not only a compulsory stop, but a clocking station. When spoken to he left the car. The manager intimated that the drivers were instantly dismissed, and the Committee decided to forward particulars to the association.

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MISCELLANEOUS NEWS AND NOTES.

Nottingham Gas Department are equipping two more stations in order to increase the facilities already provided for charging gas containers of motor vehicles.

Central London Railway.—The Board of Trade has extended for one year the time under the Central London Railway Act, 1913, for the construction of certain railways and works.

Fares at Pontypridd.—Pontpridd Electricity and Tramways Committee have decided to apply to the Board of Trade for permission to increase the workmen's fares from one halfpenny to one penny.

Institution of Municipal and County Engineers.—There will be a discussion on the "Supply of Power or Fuel for Vehicles for Public Highways," on Friday, November 30, at Burlington House, Piccadilly, W., at 5 p.m.

Belfast Tramway Employees.—The award of the Committee on Production in respect of the difference between Belfast Corporation and the Electrical Trades Union with regard to certain men in the employ of the Corporation has been issued.

Guiseley-Otley Railless Service.—A deputation from the Otley and Guisely Councils is to wait upon the general manager of Leeds Corporation Tramways, to ask for improvements in the service of railless trolley cars, and the provision of shelters at the termini.

Damages Against Manchester Tramw ys.—A special jury at the Manchester Assizes on Monday awarded Mrs. Lily Cox £200 damages against Manchester Corporation for personal injuries sustained in a collision between a tramway car in which she was riding and a lorry.

Indian Railway Electrification.—The *G.I.P. Magazine*, states that although no definite plans have been decided upon for the electrification of the Great Indian Peninsula Railway, it is highly probable that on the conclusion of the war a scheme will be undertaken.

Negligent Conductors Dismissed.—Replying to a complaint that cars were started before passengers could alight, the Chairman of Plymouth Tramways Committee said the general manager was very strict upon that point, and had discharged several employees for starting the cars under such circumstances.

Queues at Sheffield.—The Tramways Committee have placed notices in the cars requesting passengers to form queues at terminal stations. It is stated, however, that much pushing to board the cars is still to be noticed. The remedy would be to follow the example of Bradford in obtaining a by-law on the subject.

Proposed Development at Belfast.—In connection with a Bill to be introduced next Session, the Belfast Harbour Commissioners propose greatly to improve the harbour accommodation. There will be a new deep water channel, two docks, quay extensions, new jetty construction, and provision for railways and tramways.

Government Officials as Railway Directors.—In reply to a question in the House of Commons on Wednesday, Mr. Wardle, Secretary to the Board of Trade, said he was aware of instances where Government officials after retirement from the public service had accepted railway directorships, but he saw no reason, even if it were in his power to do so, to put an end to the practice.

The Rush Periods.—The Publicity Bureau of the allied traffic undertakings of London are appealing by newspaper advertisements to shoppers, theatre-goers, and others not obliged to, to refrain from travelling between 5 and 6.30 p.m., and on Saturdays between 12.30 and 1.30 p.m. Women on shopping excursions would find much more comfortable travel between 11 a.m. and 4 p.m.

Conductor's Uniforms.—Leeds Tramways Committee have forbidden the wearing of regimental badges on the caps of conductors. The caps already bear the city coat of arms, and it appears that women conductors have adopted the custom of pinning various regimental badges on the caps. The practice had become so frequent that the Committee found it desirable to pass the rule forbidding it.

Omnibus Traffic and the Roads.—The Executive Council of the County Councils Association has adopted a resolution that having regard to the great cost of keeping up the county roads in a fit state for the motor omnibus traffic recently introduced for the profit of the owning companies, legislation should be carried out by the Government for the payment to the highway authorities of a fair mileage rate by the owners of such vehicles.

Board of Trade and Track Inspection.—Complaints having been made to the Board of Trade by Musselburgh Council of accidents on the local tramways, the Board replied that "the responsibility for the proper maintenance of the undertaking rested with the promoters, and that the Board did not carry out any system of periodic inspection of tramways." The Council are dissatisfied with the reply, and propose to take further steps with the company in connection with the track and the derailment of cars resulting from the alleged defective condition of the rails.

London United Tramways Bill.—A conference of local authorities concerned was held at Chiswick Town Hall on November 16, to consider what action should be taken in regard to the new Bill to be promoted by the London United Tramways Company. There were representatives present from Chiswick, Acton, Brentford, Ealing, Esher and the Dittons, Hanwell, Hayes, Heston-Isleworth, Maldens and Coombe, Surbiton, Teddington, Twickenham, Uxbridge, and Wimbledon. It was agreed that any action taken should be of a joint nature, and it was reported that Mr. Devonshire, managing director, would meet the representatives on behalf of the Tramway Company at an adjourned conference to be held at Chiswick

Passenger Awarded Damages.—In an action against Glasgow Corporation for £250 damages in respect of personal injuries sustained by Mrs. Mitchell, it was stated that when she was about to alight from a tramcar at a stopping place, the car suddenly started, and she was thrown down. The defence was that pursuer was injured as the result of leaving the car while it was in motion. Lord Ormidale granted decree for £80 and expenses.

Drastic Treatment for Tramway Employees.—Before the Broadstairs Tribunal on Tuesday, it was stated that several tramway employees who held conditional exemption certificates had left their positions and obtained work at a new aerodrome without notifying the tribunal of the change. On the appeal of the National Service representative each exemption was withdrawn, and the men were directed to join the colours immediately.

A Dangerous Practice.—Complaints are being made in many towns of the carelessness of drivers starting the cars before all the passengers have had an opportunity to enter or alight. In Glasgow for instance, in reply to a question in the City Council, Mr. Montgomery, convener of the Tramways Committee, said that he was quite aware that drivers were guilty of starting the cars too soon. The general manager had the matter before him, and he was dealing with the drivers who were reported.

Railwaymen's Wages.—The National Union of Railwaymen, at its conference at Leicester, on Thursday, declined to accept the Government's offer of 5s. advance in their wages, which would have brought the increase on pre-war wages up to £1 per week. The debate was heated throughout. Many of the delegates intimated that they had brought with them definite instructions from their branches, and it was evident that the majority of the employees regard the 5s. advance as inadequate.

Manchester Tramway Fares.—The Manchester Tramways Committee on Tuesday decided to recommend the Council to shorten the penny stages on the various routes by 620 yards, with the object of enabling the Committee to provide £100,000 in relief of the city rates. Originally the Committee proposed that their contribution should be £50,000 for the year, but the Council insisted that the former contribution should be maintained. The recommendation will come before the Council on December 5.

Late Car for Soldiers on Leave.—By arrangement between Burnley, Colne, and Nelson Councils, a tramcar now conveys soldiers to the Colne and Nelson districts who arrive by the last train at Burnley at 11.23 p.m.; civilians are also carried. The car starts from the centre of Burnley, and waits opposite the station until the train arrives, no matter how late it is. Mr. Henry Mozley, the general manager, has made arrangements with the station authorities to let soldiers know what course to take in order to catch the car.

Trade Control After the War.—Sir Albert Stanley, President of the Board of Trade, is sponsor for a Bill issued on November 17, under the title of the Imports and Exports (Temporary) Bill. Its object is to continue for three years after the war the powers the Government have exercised during the war as regards the control of imports and exports. Otherwise, it is pointed out, as soon as hostilities cease there will be no power to prohibit importation of goods of a particular origin, or to prohibit exportation, except in the case of certain specified classes of goods. The measure, if passed, will accomplish important results as regards protection of the motor industry among others.

Commercial Vehicle Tires.—George Spencer, Moulton and Co., Ltd., 239, Deansgate, Manchester, have issued their new list, 102, which will be invaluable for reference purposes to owners and to agents. It contains a new scale of prices and the buyer can thus more readily estimate his outlay, but exact and detailed quotations, with information about allowances, nearest fitters, etc., will readily be supplied by the head office, Solid Tire Department, Deansgate, Manchester. A feature which will be extremely useful is a list of press owners in all parts of the kingdom, and this compilation should prove specially helpful to those who are not familiar with the facilities. A schedule of loads for each section of tire, the terms of guarantee and sale, and much other information is embodied in this compact new edition of the Spencer-Moulton list.

The Length of a Shift.—Complaint has been made to Dundee Tramways Committee of long shifts and the irregular hours of drivers and conductors. A six-hour shift was described as excessive, especially in the winter, and was more particularly felt by the female staff. It was desired that the hours should be arranged to obviate the necessity of two meals having to be taken in one relief. Mr. Fisher, the manager, in reply, said that under a cast-iron arrangement the guillotine might drop when a man was at Monifieth. He would have to make his way home to his meals, and somebody would have to go out there to relieve him, whereas he relieved everybody on the High Street. In some weeks the long shift did not occur at all. There was no shift more than six hours, and on some of the routes there were none of six hours. Councillor Spence was surprised to hear of grumbling about a six-hour shift at the present time, but Bailie Gillespie suggested that the 54-hour week should be reverted to, as since the employment of women as conductors, the scarcity of labour had been alleviated. Mr. Fisher replied that if a man was working 54 hours, he asked to be put on 60 hours, in order to get the extra 5s. The employees had been told that if there was any system in operation elsewhere that was more in accord with their wishes, the Committee would adopt it. The Committee appointed a sub-committee to go into the question of hours, but deferred consideration of an application for an advance of £1 a week on pre-war wages.

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Compressed Gas for Omnibuses.—As many of our readers are aware the London General Omnibus Company has for some time been considering the use of gas in place of petrol. Experiments have been made with steel gas-containers, placed under the omnibus bodies and supported by the chassis, which would hold enough compressed gas for two average double journeys on any London route—say about 65 miles. At present, however, there are difficulties due to the short supplies of steel and the scheme remains practically in the same position that was reached some time ago. If all the omnibuses were converted for working by gas it is estimated that 25 million cubic feet of gas would be required weekly.

Stopping Cars to Collect Fares.—Dundee Tramways Committee have further discussed the revival of the system of stopping cars at the end of the first stage in order that all fares may be collected. The general manager stated that the system was no innovation. It was incorporated in the rules drawn up by the Town Council in 1899. In the days before the war there was no difficulty because the men conductors were expert. After the war broke out they could not insist on the rule being carried out. The result was that he was inundated by complaints of people leaving the cars without paying. Bailie Noble thought the Town Clerk should take up the question of by-laws generally. They were working under tramway regulations drawn up when the system was started. A Sub-Committee was appointed to consider the matter, and it was agreed to abolish this system of collecting meantime.

Irish Light Railway Applications.—Mr. Duke, Chief Secretary for Ireland, answering a question by Mr. Byrne in the House of Commons, on November 20, stated that it was provided by general rules made in 1913 that applications under the English Light Railways Act should be submitted to the Light Railway Commissioners in May or November, and by a rule of 1914 applications might be made in any other month with the consent of the Commissioners. As to Ireland, and the lodging of the necessary documents with the local authorities, Irish county councils were only required to meet quarterly, and he was advised that any amendment of the Light Railways and Tramways (Ireland) Act as to the times of lodging documents should be limited to permitting applications in Ireland to be made to county councils at any quarterly meeting. Legislation, however, would be necessary to effect the change, and he saw no prospect of it at present. He had no reason to believe that any actual inconvenience had been caused by the existing limitation (which allows of applications only twice a year.)

Christmas and New Year Holidays.—The Amalgamated Association of Tramway and Vehicle Workers, whose headquarters are at Salford, are agitating for the general suspension of the tramway service throughout the kingdom on Christmas Day. All tramway concerns in the country have been communicated with, replies in some cases being favourable and in many others unfavourable The association intend to continue the agitation, and mass meetings of men and women immediately concerned have been called for the week end to consider the matter. Dundee Tramways Committee have refused a request from their employees for a holiday on New Year Day as the counterpart of the widely conceded holiday in England on Christmas Day. The application was made by the Men's Union, and the town clerk added that a general request to the same effect had been received from the Union's headquarters. It is stated that there is no likelihood of any discontinuance of the services on the Liverpool tramways, where the custom has always been to have the Sunday service on Christmas Day. The management arrange for all employees to have a day off during Christmas week, and this has hitherto proved satisfactory. Liverpool tramway men are not members of the Amalgamated Association of Tramway and Vehicle Workers.

Yarmouth Rejects a Closing Down Proposal.—In connection with the necessity of repairing the Yarmouth Tramways between the Hall Plain and the fishing village of Caistor, the Corporation have discussed the question of closing down the whole undertaking until after the war. The General Purposes Committee reported against the suggestion by eleven votes to three, and recommended the repair of the Caistor section. It was reported by the Surveyor that the rails had ten years further life; the foundation being in perfect condition. The rails needed repacking, three turnouts required to be removed and a number of joints welded. Rails were in stock to make good any found broken. To carry out the work with the present poor labour supply it would be necessary to close the line for three months. The Ministry of Munitions would not permit more than £500 to be spent, but the Surveyor believed that the work could be done practically for that amount. During the discussion Councillor Middleton remarked that the Surveyor's estimate was £1,200. The general manager reported that on the Caistor section the cars had rolled and oscillated since 1913, which was due to the rails being out of line at various places. The roll and oscillation could be minimised by reducing speed, which had been ordered. For the whole of the undertaking there were 18 cars in running order and 17 were waiting for spare parts, which he hoped would be obtained soon. He had been using parts from the laid up cars to keep the others running. On the question of closing the whole undertaking, Councillor Knights asked how the electricity works would maintain their position without the £3,000 a year received from the tramways. As to the tramway deficit during the war, the borough accountant informed the Council that it was met by the town's share of the Government grant to the East Coast. The surveyor's report was adopted, and it was stated that that official hoped to execute the work without closing the line.

Advisory Committee on Railways.—In the House of Commons Sir Albert Stanley (President, Board of Trade), replying to Mr. Gilbert, said: The Board of Trade, in consultation with the Ministry of Reconstruction, are giving close attention to the problems that will arise when the present war control of railways ceases. In connection with the various aspects of these problems, the Board are being advised by a number of gentlemen possessing expert knowledge or experience. The names of the gentlemen are:—Mr. W. M. Ackworth, Mr. W. Berry, Sir John Bradbury, Sir Gilbert Claughton, Sir Thomas Ratcliffe Ellis, Mr. Kenneth Lee, Sir Ernest Moir, Mr. Ernest Moon, Sir William Plender, Sir David Shackleton, Sir H. Babington Smith, Mr. H. Steel, Mr. J. H. Thomas, Sir Herbert Walker, Mr. Sydney Webb, Mr. A. W. Wyon. They do not, however, constitute a formal committee, and there are, therefore, no terms of reference. In reply to a question, Sir Albert said that he had no hesitation in giving a pledge that nothing would be done without the House being first consulted.

Lancashire and Cheshire Managers' Association.—The quarterly meeting of the Lancashire and Cheshire Tramway Managers' Association was held at the Town Hall, Blackburn, on Friday, November 16. Mr. J. H. Cowell, general manager of Blackburn Corporation tramways, presided, and a discussion took place on several important matters. Afterwards the members were taken over some of the routes in a special car driven by Miss N. Sharrett, one of the first women to act in that capacity in Blackburn, if not in the country. A visit was paid to the Intack tram depot, and on returning to the Town Hall, the members were welcomed by the Mayor (Mr. Lawrence Cotton, J.P.), who afterwards entertained them at tea. Mr. J. Barnard, general manager of Bolton Corporation tramways, expressed the thanks of the company to the Mayor, and Mr. G. W. Holford, general manager of Salford Corporation tramways, thanked the vice-chairman and the general manager for the arrangements which had been made. Mr. Councillor Higham responded, and it was generally agreed that a very pleasant and instructive time had been spent.

PERSONAL.

Councillor A. A. Thomson has been appointed chairman of the Croydon Tramways Committee.

Mr. C. H. Wordingham, president of the Institution of Electrical Engineers, has accepted office as one of the vice-presidents of the British Electrical and Allied Manufacturers Association (Incorporated).

Councillor James Smith, a member of Newcastle Corporation Tramways Committee, has been presented with a testimonial in recognition of his services on behalf of tramway workers and labour generally in the City.

Auckland Electric Tramways.—At the general meeting of this Company on November 20, Mr. C. G. Tegetmeier, the chairman, alluded with deep regret to the death of Lieut.-Colonel Burton, who had joined the board in 1908, and whose presence they greatly missed.

Alderman Russell Taylor has been re-elected chairman of Liverpool Tramways Committee, and Alderman Fred Smith deputy-chairman. In returning thanks, the chairman referred to the want of consideration shown by passengers towards the women conductors, who were doing their work wonderfully well.

Mr. John C. Mitchell, F.C.I.S., was appointed at the meeting of the Lambeth Borough Council held on Thursday, November 22, as the Council's representative on the Metropolitan Water Board. Councillor Mitchell is treasurer of the Underground Electric Railways Company of London, Ltd., and Allied Companies, and has recently served as President of the Chartered Institute of Secretaries.

Mr. J. B. Hamilton, general manager of the Leeds Tramways, reported to the Committee on Monday that he had been nominated by the Municipal Tramways Association to join the Committee, which is being set up by the Board of Trade to co-ordinate supplies, and thus economise the services of the tramways of the country. He was given a free hand in regard to the acceptance of the position. For some time past Mr. Hamilton has filled a responsible post at the Admiralty in connection with the arrangement of labour difficulties, a work which is now on a well-organised basis. It is understood that the acceptance of the new post will involve his retirement from Admiralty work.

Councillor George New, J.P., chairman of Sunderland Tramways Committee, has been appointed an alderman. Like the late Councillor T. Summerbell, M.P., whom he succeeded in the chairmanship eleven years ago, he is a member of the Labour Party. He has served on the Education, Watch, Health, Lighting, and other Committees, but his principal work (says the *Sunderland Daily*

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Echo) has been in connection with the tramways. He took a prominent part in the propaganda which resulted in the decision to municipalise the service, and when the Tramways Committee was formed he was elected a member. It is acknowledged by all who are conversant with the work he has achieved as chairman, he has been eminently successful.

CONTRACTS AND ORDERS.

Steam Wagon.—The Monk Bretton Urban District Council has under consideration the purchase of a new steam wagon.

Motor Fire Engines.—Whitehaven Fire Brigade Committee are considering the purchase of a motor fire engine. The town clerk has been instructed to ascertain whether it would be possible to obtain sanction for the raising of a loan for the purpose. Lower Bebbington Urban District Council are inviting tenders for the supply of a motor fire engine. Particulars may be obtained on application to the surveyor, Council Offices, Lower Bebbington.

FINANCIAL REPORTS AND MEETINGS.

Power Gas Corporation.—A dividend is recommended at the rate of 6 per cent., less income tax, on the ordinary shares.

Rolls-Royce, Ltd.—The report for the year ended October 31 last gives a net profit of £82,740 against £44,171 in the preceding year. A dividend is recommended at the rate of 10 per cent., less tax.

Dick, Kerr and Company.—During the week there were rumours with regard to an amalgamation affecting Dick, Kerr and Company. The company has now denied that any project of the kind is under consideration.

Belsize Motors, Ltd.—The directors announce that the accounts with the Treasury are not yet adjusted, but the ordinary share distribution for the past year is to be brought up to 15 per cent., less tax, the same as a year ago.

L.C.C Traffic Receipts.—The traffic receipts for the week ended November 21 amounted to £55,271 an increase of £11,952, as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to November 21 (thirty-three and a half weeks) the total receipts were £1,869,174, an increase of £237,089 on the corresponding period of 1916.

Cape Electric Tramways.—After providing for debenture interest and redemption, there is a net credit balance of £39,152, as compared with £23,680 for the previous twelve months. The amount carried to reserve has been increased from £5,000 to £12,000 and the ordinary dividend has been raised from 3½ to 5 per cent., and £2,597 is carried forward. During the year the tramways carried 23,752,016 passengers, earning £231,105, as against 22,477,366 passengers, earning £212,791, in 1915-6. A satisfactory increase on the preceding year is shown both as regards the Cape Town and Port Elizabeth systems, which is attributable to the number of troops from Australia and New Zealand who have passed through Cape Town and to the general prosperity throughout South Africa.

Auckland Electric Tramways.—Presiding at the meeting of the Auckland Electric Tramways Company, Ltd., on Tuesday, Mr. C. G. Tegetmeier, the chairman, said that the main features of the year ended June 30 last were the substantial increase in receipts, and the almost equal increase in working expenses. The traffic receipts amounted to £282,697, which was £7,914 more than in the preceding year, and was the highest amount yet taken. There was a corresponding increase in the number of passengers carried, which reached a total of 43,351,000, or nearly 1,000,000 more than in the preceding year. Fortunately the increase of £15,000 in traffic receipts during the past two years had been sufficient to make up for the increase in expenses. They might anticipate with confidence a further development of traffic. Considerable difficulties had been met with in regard to the supply of materials and the shortage of suitable labour. During the year 34 of their employees had left for military service, making a total of 121 since the beginning of the war. The strike of coal miners in New Zealand in April last affected the supply of fuel and interfered with their services, but the total car mileage showed a slight increase. Under the New Zealand laws the income-tax is leviable on the companies and not on the individual shareholders in the company. As a consequence the whole of the profits are subject to income-tax on a higher scale. As the company are serving a public need, and with statutory limitations upon the price they can demand from the public for their services, the New Zealand laws press upon their shareholders somewhat unfairly. In New Zealand a similar enterprise if carried out by a municipality would be entirely exempt from taxation. During the year they had, at the request of the City Council, constructed a line about half a mile in length connecting different parts of the system in the centre of the city. It had been an expensive line to construct, but it would facilitate the handling of the traffic. The net result of the years' working was that after providing for all revenue charges, and setting aside £25,000 for renewals and depreciation, they had a net profit of £55,317, or £746 more than in the preceding year. They proposed to make the same allocation as in the preceding year, namely, £10,000 to reserve and £35,625 in payment of a dividend of 1s. 7d. per share for the year on the ordinary shares. The reserves which had been established and added to on this occasion including the carry-forward, amounted to £203,518, which was more than 20 per cent. of the total paid-up share and debenture capital.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended November 10 give total receipts of £195,674 or £29,614 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £96 8s. 9d. per mile of single track, and last year at the rate of £81 16s. 10d., thus showing an increase for the week of £14 11s. 11d. per mile open. Certai London and provincial tramways have temporarily discontinued th publication of traffic receipts.

London Traffic Facilities.—Mr. Wardle replying for the Board o Trade to Mr. Harcourt in the House of Commons on Thursday, said So far as railways and tramways are concerned I am not aware of curtailments of London traffic facilities other than those arising from conditions due to the war. Specific complaints on the subject always receive careful consideration, and inquiry is made when necessary; but I am afraid that in present circumstances inconvenience to the public cannot be avoided.

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Scarborough Electric Tramways Co., Ltd.
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Paisley & District Tramways Co.
Hastings & District Electric Tramways Co., Ltd.
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Plymouth Tramways
Gloucester Corporation Light Railways
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Stockport Corporation Tramways
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH NOV. 22 or previous.	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	70½	71½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	60/-	60/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	50/-	50/-
4%	4%	Do. 4% Deb.	100	91	70	69½
4½%	4½%	Do. 4½% Deb.	100	98½	71	71½
5%	5%	Do. 5% Deb.	100	96	67	67½
—	—	Associated Omnibus Co., Ord. ..	5/-		1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	104	104½
—	1/-	Bath Electric Trams Pref. Ord.	1	½	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1		10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	71½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	41½	42
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90	90½
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	£6/15/9	6¾
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	29½	28
6%	5%	Do. Pref. Ord.	100	106	29	29
5%	5%	Do. 5% Cum. Pref. ..	100	103	42½	42½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	82⅝	82⅝
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	55¼	55¼
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	34	32
6%	6%	Do. 6% Cum. Part. Pref.	100	—	74½	74½
5%	5%	Do. 5% Deb.	100	92	75	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77⅛	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	73	71½
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	73¼	71½
1/-*	1/-*	Cape Elec. Trams.	1		11/5	11/-
1/3	1/3	City of B. A. Trams	5	5½	82/6	82/6
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	81¼	81¼
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
3/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10⅜	10⅜
—	—	Hastings & Dis. Elec. Tram Ord.	10/-		1/0½	1/3
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1		10/-	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-		17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅛	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9⅛	9⅛
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	71
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9½d.*	9½d.*	Llandudno & Colwyn B. Ord.	1	—	10/-	10/-
--	1½d.	London & Sub. Traction Ord. ..	1	⅛	2/6	2/10
6d.	6d.	Do. 5% Pref.	1		7/-	7/4½
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	80½	81⅛
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	79½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	35½	35½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9½d.*	Manaos Trams & Ltg. Ord. ..	1		3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	70½	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1½	$1½	Mexico Trams. Common ..	$100	70	32½	32½
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	88½	88½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
/2½*	2/-	National Steam Car	1		19/9	20/-
9½d.*	9½d.*	New General Traction	1	⅜	7/3	7/3
½d.	6d.	Northern Gen. Trans. Ord. ..	1		12/9½	12/9½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	80/3	80/3
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	6/9	6/9
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/6	15/-
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1		6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1		11/-	11/-
1/4	8d.	Provincial Trams. Ord.	1		19/9	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86½	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	75	75
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89	89½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74¾	74
12/-	10/-	Shanghai Elec. Cons.	10	13	14⅛	14⅛
3d.	3d.	Singapore Elec. Trams. ..	5/-	½	4/7	4/6
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77⅛	77⅛
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	66
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5		84/7½	84/7½
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21¾	15½	15¾
—	—	Undgd. Elec. Rys. of London ..	10	21½	33/9	36/3
		Do. "A"	1/-		5/3	5/7½
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102⅞	103½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102½	103
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	82½	81½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Nov. 13	449	480	+ 31	32	14,321	+ 1,165
Aberdeen Corporation ..	,, 14	1,817	2,011	+ 194	24	52,514	+ 5,809
Ayr Corporation	,, 17	265	328	+ 63	27	14,132	+ 1,418
Belfast City	,, 16	5,777	6,825	+ 1,048	33	211,660	+ 23,244
Birkenhead Corporation ..	,, 18	1,444	1,861	+ 417	33½	61,100	+ 9,268
Birmingham Corporation ..	,, 10	14,461	19,344	+ 4,883	32	585,924	+ 61,063
do. Motor Omnibuses ..	,, 10	1,044	1,184	+ 140	32	33,313	+ 944
Blackburn Corporation ..	,, 14	1,139	1,395	+ 256	30½	50,605	+ 7,690
Blackpool & Fleetwood ..	,, 17	297	379	+ 82	43	41,623	+ 497
Bournemouth Corporation ..	,, 21	1,832	2,321	+ 489	33½	88,433	+ 7,178
Bradford Corporation ..	,, 17	6,263	7,478	+ 1,215	33	256,745	+ 26,929
Bristol	,, 16	4,730	5,456	+ 726	46	249,894	+ 23,308
Burnley Corporation ..	,, 17	1,535	1,856	+ 321	..	..	..
Burton-on-Trent Cor. ..	,, 17	263	307	+ 44	33	10,299	+ 971
Bury Corporation ..	,, 18	1,220	1,560	+ 340	33½	55,774	+ 6,886
Chatham & District ..	,, 15	1,191	1,147	— 44	46	58,865	+ 1,852
Cork Electric	,, 8	493	556	+ 63	45	24,802	+ 1,682
Derby Corporation ..	,, 17	1,010	1,258	+ 248	33	40,334	+ 1,887
Dublin United	,, 16	6,172	6,630	+ 458	46	309,070	+ 29,196
Dundee City	,, 14	1,355	1,531	+ 176	26½	40,534	+ 3,752
East Ham Corporation ..	,, 17	1,226	1,272	+ 46	33	46,570	+ 2,687
Exeter Corporation ..	,, 16	372	369	— 3	33	13,599	— 70
Glasgow Corporation ..	,, 17	28,463	26,898	+ 3,435	24⅔	645,197	+ 73,378
Glossop (U.E. Sup. Co.) ..	,, 17	134	164	+ 30	46	7,099	+ 688
Halifax Corporation ..	,, 13	1,980	2,247	+ 267	32⅔	82,134	+ 6,852
do. Motor Buses ..	,, 13	47	51	+ 4	32⅔	1,596	— 58
Hastings and District ..	,, 18	771	1,060	+ 289	46	57,745	+ 9,214
Huddersfield Corporation ..	,, 17	2,575	3,201	+ 626	33	106,689	+ 10,796
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	Nov. 17	587	708	+ 122	33	25,516	+ 2,584
Ipswich Corporation ..	,, 17	418	562	+ 144	33	23,143	+ 5,321
Isle of Thanet	,, 17	245	148	— 97	7	1,172	— 862
Kilmarnock Corporation ..	,, 17	169	203	+ 34	26½	5,296	+ 533
Lanarkshire	,, 17	2,340	2,878	+ 538	46	127,413	+ 20,578
Lancashire United ..	,, 14	1,830	2,407	+ 577	46	108,077	+ 23,760
Leeds City	,, 17	9,418	11,032	+ 1,614	33	366,545	+ 37,856
Leicester Corporation ..	,, 3	3,435	3,864	+ 429	..	..	..
Leith Corporation ..	,, 17	834	1,055	+ 221	26⅔	28,918	+ 5,125
Leyton U.D. Council ..	,, 15	1,513	1,838	+ 325	33	62,691	+ 6,739
Liverpool Corporation ..	,, 17	13,983	16,189	+ 2,206	45⅔	714,972	+ 65,750
Llandudno & Colwyn Bay	,, 9	222	237	+ 15	49½	17,345	— 854
London County Council	,, 21	42,319	55,271	+ 11,952	33⅓	1,869,174	+ 227,089
Maidstone Corporation ..	,, 15	199	221	+ 22	33	8,191	+ 757
Manchester Corporation	,, 17	18,108	21,009	+ 2,901	33	684,347	+ 55,527
Nelson Corporation ..	,, 17	185	224	+ 39	33	7,836	+ 658
Newcastle-on-Tyne Cor.	,, 17	6,772	8,064	+ 1,292	33	260,000	+ 37,107
New St. Helens & Dist. ..	,, 14	1,039	1,223	+ 184	20	29,891	+ 7,208
Northampton Cor. ..	,, 16	724	836	+ 112	33	27,771	+ 3,895
Nottingham Corporation	,, 15	3,923	4,481	+ 558	33	145,907	+ 14,711
Oldham Corporation ..	,, 18	2,108	2,676	+ 569	34	97,021	+ 11,565
Portsmouth Corporation	,, 17	2,144	2,641	+ 497	..	..	..
Provincial	,, 17	1,927	2,279	+ 352	6⅔	16,057	+ 1,504
Reading Corporation ..	,, 15	838	1,051	+ 213	33⅓	34,986	+ 6,023
Rhondda Tramways ..	,, 15	1,297	1,569	+ 272	46	69,122	+ 9,834
Rotherham Corporation	,, 21	1,546	1,899	+ 353	33⅓	60,804	+ 8,126
Salford Corporation ..	,, 19	5,055	7,344	+ 2,289	33⅓	221,845	+ 36,676
Sheffield Corporation ..	,, 18	10,353	12,511	+ 2,158	34	408,745	+ 48,419
Southampton Cor. ..	,, 14	1,666	2,082	+ 415	32⅔	67,466	+ 11,424
Southend-on-Sea Cor. ..	Oct. 31	699	583	— 116	31	30,698	— 919
South Shields Cor. ..	Nov. 17	828	921	+ 93	33	31,644	+ 3,512
Sunderland Corporation..	,, 18	1,555	1,836	+ 281	33	60,572	+ 5,279
Sunderland District ..	,, 14	644	756	+ 112	3	1,549	+ 259
Swindon Corporation	,, 14	207	261	+ 54	32⅔	8,960	+ 2,143
Torquay Tramways ..	,, 15	490	672	+ 181	46	30,759	+ 3,045
Tyneside Trys. & Trmrds.	,, 7	589	806	+ 217	19	17,320	- 4,291
Wallasey Corporation ..	,, 17	1,197	1,398	+ 201	33⅓	53,525	+ 6,379
Walsall Corporation ..	,, 17	807	1,022	+ 215	33	32,500	+ 4,447
Walthamstow U.D. Coun.	,, 17	938	1,136	+ 198	33	41,502	+ 4,223
Warrington Corporation	Oct. 25	509	570	+ 61	30	16,209	+ 1,318
West Ham Corporation	Nov. 15	2,997	3,613	+ 616	32⅔	120,856	+ 12,991
Wigan Corporation ..	,, 15	1,705	2,123	+ 418	33	65,751	+ 6,566
Yorkshire (West Riding)	,, 18	1,569	2,186	+ 617	46	97,862	+ 16,832

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War :—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Nov. 18	£53,617	£54,485	46	£2,384,449	+ £34,709
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo (4 wks)	Aug. 12	2,791	2,693	20	15,737	— 133
Brazilian Traction (Mlrs.)	Sept.	7,138,000	7,925,000	39	68,430,000	+ 5,279,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Sept.	414,811	457,709	13	1,350,512	+ 100,116
Buenos Aires Lacroze ..	Oct.	39,670	39,067	17	149,879	— 1,737
Burmah Tram. & Light Rs.	Oct.	29,768	28,955	13	81,837	+ 3,907
Calcutta .. .. Rs.	Nov. 17	73,680	65,637	46	3,126,737	+ 5,351
Cape Town	Oct.	14,238	17,128	..	..	..
Carthagena and Herrerias	Oct.	2,539	2,805	43	41,210	+ 16,071
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Oct.	2,080	1,229	13	4,303	— 2,822
Hong Kong .. .. $	Sept. 15	16,525	13,817	37	499,566	— 41,061
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Oct.	4,434	4,069	43	40,615	— 1,441
Lima	Oct.	33,303	37,537	43	359,732	+ 22,341
Lisbon .. .. Escu	Sept.	194,276	228,097	..	..	..
Madras .. .. Rs.	Nov. 15	31,596	35,433	45	731,648	+ 66,142
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	Aug.	147,774	150,657	..	..	..
Montevideo	Oct.	28,729	30,153	52	359,832	+ 12,060
Pernambuco	Nov. 18	3,555	4,279	45	176,095	+ 35,048
Peruvian .. .. $	Oct.	945,590	1,047,220	17	3,952,390	+ 363,560
Port Elizabeth	Oct.	3,131	3,885	..	..	..
Rangoon	Oct.	5,043	5,667	43	50,021	+ 3,690
Shanghai .. .. $	Aug. 22	21,712	22,369	..	..	..
Singapore .. .. $	Sept. 29	12,989	13,016	39	503,884	+ 13,388
Toronto .. .. $	Sept.	913,535	1,023,517	39	8,891,112	+ 885,548
Winnipeg .. .. $	Sept.	267,497	267,170	39	2,431,794	— 29,660

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery and erection of Three Fan Draught Cooling Towers, at Stuart Street Station.

Specification, drawings and form of tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Engineer and Manager, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Wednesday, December 12, 1917.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

Town Hall, Manchester, November 9, 1917.

THOMAS HUDSON, Town Clerk.

CITY OF CARLISLE.

Electricity Department.

The Corporation of Carlisle invite tenders for the supply, delivery and erection of the following plant:—

1. One 1,500/2,000 kw. High-Pressure Turbo-Alternator.
2. One Surface Condensing Plant for above Turbo-Alternator.

Specification, with general conditions and form of tender, may be obtained from the undersigned at the Electricity Offices, Victoria Viaduct, Carlisle, upon payment of a deposit of Two Guineas for each section, which will be returned after the tenders have been adjudicated upon, provided a *bona-fide* tender is sent in by the date specified and not withdrawn. Extra copies of each specification may be obtained at the sum of 5s., which is not returnable.

Tenders, properly endorsed and sealed with wax, to be sent to the undersigned not later than 9 a.m. on Tuesday, December 4, 1917.

The contracts are subject to the sanction of the Local Government Board, and the Corporation do not bind themselves to accept the lowest or any tender, nor will the Corporation pay any cost incurred in tendering.

FREDK. W. PURSE, M.I.E.E., M.I.MECH.E., City Electrical Engineer.

Electricity Offices, Victoria Viaduct, Carlisle.
November 9, 1917.

CITY OF LEEDS.

Electricity Department.

The Leeds Corporation desire to Contract for the purchase of a Turbo-Alternator and Jet Condensing Plant, 2-phase, 50 periods, 2,100 volts; capacity 6,000 KW. at ·75 power factor; steam pressure 170 lb., vacuum 27½" with barometer at 30". Speed not to exceed 1,500 r.p.m.

Tenders will be invited from selected firms.

Makers who are willing to tender and able to guarantee completion and erection within nine months under P.4 Certificate are requested to submit their names and the names of their proposed sub-contractors by Tuesday, December 4th.

C. NELSON HEFFORD, Manager.

1, Whitehall Road, Leeds.
November 29, 1917.

POSITIONS VACANT.

CORPORATION OF LEICESTER.

Junior Shift Engineer.

The Tramways and Electricity Committee invite application for the position of Junior Shift Engineer at their Generating Station. Salary to commence at £156 per annum. Age not less than 21 years.

Candidates must have a thorough training in mechanical and electrical engineering, with experience in both continuous current and single-phase alternating current.

Applications, giving age and experience, accompanied by two recent testimonials, to be addressed to the BOROUGH ELECTRICAL ENGINEER, Box 86, Leicester, endorsed "Junior Shift Engineer," and delivered not later than Tuesday, December 11.

T. ROBERT SMITH, Borough Electrical Engineer.

Electricity Offices, Leicester.

FOREMAN LINESMAN.

Wanted for a Tramway System comprising 90 miles of single track an experienced man for the position of Overhead Line Foreman.

Applicants must have held a similar appointment and have a wide experience in both constructional and maintenance work of the most modern type.

Wages £3 to £3 10s. per week to a suitable man (plus 12s. War Bonus).

Applications, endorsed "Foreman Linesman," stating age, present employment, wage, and previous experience, together with copies of not more than three recent testimonials, to be delivered to Box 14, TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2, not later than Saturday, December 8, 1917.

SUBSTATION ATTENDANT.

Temporary Substation Attendant required for Tramways Substation: shift duty, averaging 56 hours a week. Wages 30s. a week, rising to 40s. War wages 15s. a week. Applicants must have had previous experience of substation plant and operation. Apply, by letter, giving age, particulars of previous experience and position with regard to military service, to the GENERAL MANAGER, London County Council Tramways, 62, Finsbury Pavement, E.C.2.

SWITCHBOARD ATTENDANT.

Switchboard Attendant wanted, experienced in E.H.T. and D.C. three-wire work. Wages 35s. per 56-hour week, plus war bonus of 2s. per shift.

State age, training and experience, also when able to commence duties, to

THE BOROUGH ELECTRICAL ENGINEER.

Generating Station, Back-o'-th'-Bank, Bolton.

TICKET INSPECTOR.

Ticket Inspector required for Motor Bus Services. Age 25-35, ineligible. State age, experience and wages required. Permanent position to suitable man. One with knowledge of Commercial Motors preferred.—Apply, TRAMWAYS COMPANY, Oxford.

ENGINE ATTENDANT.

An Engine Attendant is required for the Greenwich Generating Station of the London County Council Tramways; shift duties, averaging 52 hours a week. Wages 60s. a week, rising to 70s. War wages 15s. a week. Applicants must have had experience with large turbo-alternators, and hold a first-class Board of Trade certificate. Apply, by letter, giving age, particulars of previous experience, and position with regard to military service, to the GENERAL MANAGER London County Council Tramways, 62, Finsbury Pavement, E.C.2,

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Tramway Engineers,

OVERHEAD LINE MATERIALS AND SUPPLIES.

Sole Manufacturers of

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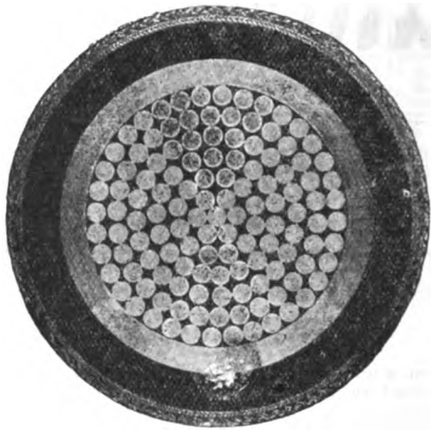
160, WOODHOUSE LANE, LEEDS.



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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, DECEMBER 1, 1917.

INSURANCE AND "SAFETY FIRST."

Attention may profitably be given to an article in *The Policy* magazine, dealing with the proposal of Bristol Corporation to establish their own insurance fund. The project is subjected to criticism of an unfavourable character, but the writer breaks new ground with a useful suggestion that deserves the attention of all traffic authorities. No light risk is attached to the establishment by a municipal authority of an insurance fund whether for fire or for third party risks. That course has been taken by a number of corporations of late years, and by good fortune rather than by any special effort to obviate risks, they have not experienced any claim sufficiently heavy to deplete their coffers. Nevertheless it is tempting the fates to adopt the innovation without at the same time devoting study to the problem of looking keenly after the work of traffic employees. Such study must result in continual vigilance if carelessness is to be repressed and encouragement given to adherence to rules. If irritation is to be avoided, the astute manager will recognise that a "Safety First" campaign is in the highest degree desirable. The circumstances under which traffic is carried on at the present time are conducive to accidents, and our contemporary makes an effective point in directing the attention of Bristol Corporation to the levying of a heavy rate at Dover in order to meet the liabilities arising from the unfortunate mishap to a Corporation tramcar. In that instance it was apparently not a case of no insurance at all but an inadequate measure of protection. The new proposal which the writer of the article has put forward is contained in a sentence directing attention to the potentialities of a well-organised "Safety First" campaign throughout the country, supported—if not initiated—by the insurance offices. A precedent for that course might be found in the practice of the companies subscribing to the funds of volunteer fire briagdes. An overwhelming justification for safety teaching is afforded by the remarks of Mr. Blain at the conference of the Municipal Tramways Association, reported in our issue of October 18 and quoted in our contemporary. A reduction of £50,000 in the claims costs of the London General Omnibus Company in four years indicates that a propaganda will pay for itself many times over. As an indication of what ordinary vigilance on the part of the management will effect, reference is made to the accident statistics of the Shanghai Tramways, as given in the article on that undertaking published in the TRAMWAY AND RAILWAY WORLD of September 13. The figures show that, whereas in 1909 the number of accidents per million passengers was 46·72 and the number of personal injuries per million passengers 19·54, the return for the year 1916 showed only 8·49 and 3·97 respectively. There are several ways in which such an improvement may be secured. It rests with managers to insist that employees shall pay attention to the rules drawn up to secure safe working. Here again the experience of the London General Omnibus Company may be drawn upon with profit. That Company seemingly stands alone in holding an annual competition for a challenge shield between the garages. What is there to prevent the adoption of a similar event in tramway depots? Good work is already done in the case of tramways by the payment of bonuses to car crews against whom the fewest accidents are recorded, but possibly the interest of all concerned might be quickened, if the scope of the rivalry was enlarged by a competition between depots.

THE NATIONAL TRAMWAY COMMITTEE.

ACTION OF THE LONDON COUNTY COUNCIL.

The subject of the appointment, at the instance of the Board of Trade, of a National Committee of Tramway Managers (as reported in previous issues of the TRAMWAY AND RAILWAY WORLD), came before the London County Council at their meeting on November 27. It was brought up by the presentation of the following report by the General Purposes Committee:—

"A letter in terms as follows having been received from the Board of Trade, we decided to ask the Highways Committee for their views thereon—

"November 10, 1917.

"'SIR,—I am directed by the Board of Trade to state, for the information of the London County Council, that their attention has been called by the Ministry of Munitions to the fact that some of the tramway systems of this country essential for the production of munitions of war are, owing to the difficulty in obtaining material and labour for repairs, reaching a condition in which a serious breakdown may be expected unless steps to provide a remedy are taken forthwith. In these circumstances the Board propose to appoint an expert committee to whom these matters could be referred, and who would take such steps as they may see fit, subject to the approval of the Board, to meet such needs. The Board recognise that for its successful working the co-operation of the London County Council is essential, and they would therefore ask the Council to be so good as to authorise Mr. A. L. C. Fell to serve on the committee. The Municipal Tramways Association and the Tramways and Light Railways Association will be invited to nominate three and two members of the committee respectively, and it is proposed that Mr. James Devonshire should be the chairman.

"'The Board trust that the Council will understand that there is no intention to interfere with the control of the tramways, subject to the considerations indicated above. It might, for example, be necessary in some cases where tramways of one authority were deemed to be essential, and materials for necessary repairs were otherwise unobtainable, to require another undertaking to provide such materials either by conversion of double to single line, or by temporarily abandoning certain routes altogether, and transferring both track and rolling stock to routes of the other undertaking.

"'The Board have no doubt that the Council will willingly co-operate with them in the object they have in view.—I am, Sir, Your obedient servant, (Signed) ERNEST J. MOGGRIDGE.'

"The Highways Committee have informed us of the circumstances which have led up to the appointment of the expert committee, and they express the opinion that the committee set up by the Board of Trade should be constituted on a basis securing representation of the municipal and private interests concerned proportionate to their magnitude. The Highways Committee further express the view that it is important that the chairman of such a committee should be entirely free from association with any traffic undertakings likely to be affected. Failing any change in the proposed constitution of the committee, in regard to which the Council has not had an earlier opportunity of expressing an opinion, and having regard

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to the practice of the Council since the commencement of hostilities to avoid all action tending to delay or in any way embarrass the work of H.M. Government, the Highways Committee consider that the Council should, at the earliest possible date, permit Mr. A. L. C. Fell to serve on the proposed committee. We entirely endorse the views expressed by the Highways Committee, and we recommend :—

"(*a*) That the Council considers that the expert committee set up by the Board of Trade in connection with the management of tramway undertakings should be constituted on a basis securing representation of the municipal and private interests concerned proportionate to their magnitude ; and that it is important that the chairman of such a committee should be entirely free from association with any traffic undertakings likely to be affected, and therefore that the appointment of an interested party as chairman is unfortunate.

"(*b*) That, having regard to the practice of the Council, since the commencement of hostilities, to avoid all action tending to delay or in any way embarras the work of H.M. Government, and on the understanding that the Council is in no way committed as to its policy, Mr. A. L. C. Fell be permitted to serve upon the expert committee appointed by the Board of Trade in connection with the management of tramway undertakings."

On the report being presented to the Council, Mr. J. D. Gilbert, M.P., asked the chairman of the General Purposes Committee whether the fact came before the committee that the chairman of the committee which the Board of Trade was going to set up was connected with the London Omnibus Company. It was very important that the Council and the public should know that the chairman was connected with a series of motor 'bus companies, and with the Metropolitan Electric Tramways Company. He also asked whether any of those motor 'bus companies ran in competition with any of the L.C.C. tramway services.

Mr. J. Stanley Holmes (vice-chairman of the General Purposes Committee) : I have no information about the 'bus companies mentioned by Mr. Gilbert. Surely the resolution on the paper is quite sufficient for Mr. Gilbert. The Council is here recording what I believe is its unanimous opinion, that the appointment of this particular gentleman is unfortunate and undesirable, and that is as far as we can go.

The report and recommendation were then agreed to unanimously.

ACTION OF CROYDON COUNCIL.

Croydon Council have accepted a report from the Tramways Committee concurring in the proposal to set up a National Tramways Committee, but regretting that municipalities are inadequately represented thereon, and expressing the opinion that such representation should be increased. The Council are of the opinion that the terms of reference should also include the consideration of the control of motor omnibuses, and the Board of Trade are to be informed accordingly.

L.C.C. TRAMWAY MATTERS.

At the fortnightly meeting of the Council on Tuesday, a report was received from the General Purposes Committee with reference to the appointment by the Board of Trade of a National Tramways Committee, which is summarised in another column. Various reports were also received from the Highways Committee.

APPOINTMENT OF ASSISTANT PERMANENT WAY ENGINEERS.

On February 20, 1917, the Council decided that in the reorganisation of the tramways department, the salary to be assigned to each of the two positions of assistant permanent way engineer should be £300 a year, increasing by annual increments of £25 to £400. Mr. W. Craufurd and Mr. E. T. Holt, assistants in the first class, have acted as assistant permanent way engineers since 1906, and they now receive £300 a year. The Highways Committee reported that they were well suited for the positions with the designation of assistant permanent way engineer, and the Council appointed them to these positions.

WAGES OF ASSISTANT LORRY DRIVERS.

Before the war the rate of pay of assistant lorry drivers between the ages of 18 and 21 years of age was 22s. 6d. a week, but owing to the recruitment for H.M. Forces, younger persons have been employed without any change being made in the rate of pay. Under the Council's general war bonus scheme, these employees receive 1s. 4d. a week in the case of youths under 18 years of age, and 2s. 8d. in the case of those 18 years of age and over. Under the awards of the Committee on Production of March 1 and July 14, 1917, relating to the engineering and foundry trades, the employees referred to are entitled to total war wages of 4s. a week in the case of persons under 18 years of age, and 8s. a week in the case of persons 18 years of age and over. For the duration of the war the wages of assistant lorry drivers in the department have, therefore been fixed at 22s. 6d. a week, with a war wage of 8s. a week for persons of 18 years of age and over.

WAGES OF VARIOUS CLASSES OF EMPLOYEES.

The Rolling Stock Conciliation Board have dealt with applications from employees in the rolling stock and general branches of the tramways department, and have made the following decisions :— Yard and shop cleaners to be paid war wages of 8s. a week, in place of their existing war bonus of 3s. a week, and storekeepers and warehousemen to receive a bonus of 10s. a week in place of their existing war bonus and war wages. The minimum rate of pay of women of 21 years of age and over at the central car repair depot is to be 24s. a week, and the war bonus of 3s. a week is to be converted into war wages, making the total war wages 5s. a week.

The Council's representative on the Board agrees to recommend the Highways Committee to advise the Council to increase the wages of the undermentioned grades of employees in the coach body shops in the tramways department, subject to the war wages at present paid to the men concerned being reduced to 12s. a week, provided, however, that the present total wages of no employee shall be reduced :—Coachpainters by 1½d. an hour, coachsmiths by 1d. an hour, and labourers by ½d. an hour. The new rates of pay will be 11d., 11d., and 7½d. an hour respectively, in accordance with the agreement of February 16, 1917, between the National Federation of Vehicle Trades and the London Joint Committee of Coachmakers,' Wheelwrights' and Motor Builders' Trade Unions. The cost of giving effect to clauses 1 and 2 of the agreement is estimated at £3,890 for the remainder of the current financial year, and £6,850 in 1918-19.

CROWDING AT A TERMINUS.

In reply to a question by Mr. J. D. Gilbert as to what he described as the awful crowding and fighting for seats during the crush hours at Victoria terminus, Mr. G. H. Hume said that the question had been receiving the serious attention of the Highways Committee. The police, with whom the management had conferred, had agreed that the present arrangements were the best that the existing track work allowed. The Committee had, however, with a view to providing greater safety to the public and to expediting the services, considered a scheme which, if adopted, would remove the existing dead-end terminus. This scheme had been placed before the police and other authorities. In the meantime the management was taking every possible step effectually to safeguard public safety at this terminus. The Committee had been in touch with the Ministry of Munitions in the matter, and also the boroughs concerned.

Mr. Gilbert said that, even if the proposal for a loop line was agreed to by the police, it would take some time before it could be completed. Was it not possible for the Chairman of the Highways Committee to arrange that cars for certain destinations should load at a certain spot along Vauxhall Bridge Road instead of at the terminus ?

Mr. Hume : The whole question of queues is now under discussion between certain borough councils and the Highways Committee.

POSTMASTER'S ACTION AGAINST BLACKPOOL AND FLEETWOOD TRAMROAD COMPANY.

LEAKAGE OF ELECTRIC CURRENT.

At Blackpool County Court, on November 8, H.M. Postmaster-General claimed £16 1s. 8d. from the Blackpool and Fleetwood Tramroad Co., Ltd. Mr. Ross Brown (instructed by Messrs. Cotman and Son) appeared for the Postmaster-General, and Mr. Wingate Saul (instructed by Mr. J. R. Gaulter) represented the defendant company.

Mr. Ross Brown said though the action was brought for the recovery of a small sum, the importance arose from the question of liability, which both parties desired to be settled. The amount of the claim was for the cost of making good damage to the telegraph and telephone cables alleged to have been caused by leakage from the tramroad. The claim was brought under a protecting section of the Act of the defendants, and alternately under the Telegraph Act of 1878. The current was generated at Bispham, and the Post Office cable ran almost parallel to the tramroad, but owing to imperfect bonding of the tramroad there was a leakage of current, which pitted the lead sheath, and in the course of time the cable was destroyed by electrolysis, and had to be replaced at the cost of the claimant. Counsel said he understood that the case for the defendants was that as the tramroad was there before the Post Office cable was laid they were not liable.

After evidence had been given as to the escape of electricity and the damage done, Mr. Wingate Saul, addressing the Judge, said that the Tramroad Company were constituted as a railway company, and unless they were guilty of negligence they were not liable. If they were carrying on the tramway in a proper manner, and in accordance with the Board of Trade regulations, they were not liable for any damage which might happen from an escape of electricity.

Counsel quoted from the company's Act regarding telegraph and telephone lines, and said it referred to the lines in existence when the tramroad was made, and not to any lines which might ultimately be put down. He urged that the company had not done anything to damage the cable, because it was laid after the tramroad was constructed.

His Honour, Judge H. Sturges, K.C., subsequently gave judgment in favour of the Tramroad Company with leave to the complainant to appeal.

Lancashire and Cheshire Tramways Federation.—At a Conference on November 23 of representatives of the Lancashire and Cheshire Tramways, it was resolved to form a Lancashire and Cheshire Tramways Federation. The body will consist of two representatives and the manager of each tramway. A resolution was also passed in favour of the establishment of an industrial committee of representatives of authorities and employees, in accordance with the recommendation of the Whitley Report.

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MISCELLANEOUS NEWS AND NOTES.

Trailers for Blackpool.—The Tramways Committee of Blackpool have applied to the Board of Trade for permission to run trailer cars.

Blackpool Corporation is applying for a provisional order to effect various street improvements, which will increase the tramway facilities.

Greenock Extensions.—The Scottish Office have sanctioned the loan of £53,000 for the extension of the Corporation electricity undertaking.

New Power Station for Leicester.—The Town Council propose to apply for a provisional order to acquire land and erect a generating station, at an estimated cost of £285,000.

Gas Traction at Chesterfield.—The manager of the Chesterfield Corporation tramways has been authorised to have one motor omnibus fitted up so that it may be driven by coal gas in place of petrol.

Accident with Trolley Rope.—A ten-year-old girl standing on the top of a Barrow-in-Furness car was struck by the trolley rope, which swung round and caught about her neck, lifting her off the car. She fell into the roadway and was badly bruised.

The Metric System.—A discussion on the metric system will be held at the Institution of Electrical Engineers on December 13. The main object is to consider the effect on British electrical trades of the introduction of the system at the present time.

Moon Chart Cards.—Messrs. C. F. Vandervell & Co., Ltd., are issuing moon chart cards for the month of December, and will be happy to send one to those who write to Acton. The card is compiled as before by Mr. A. Midgley, the chief engineer to the firm.

Paper Money for Fares.—Complaint is made at Nottingham that Treasury notes are frequently offered in payment of fares. It is suggested that a notice should be displayed pointing out that the practice (if such it be) delays conductors in collecting, especially in a crowded car.

Austin Commercial Motors.—Owing to the Ministry of Munitions' award to workmen, and the increased cost of materials, the Austin Motor Company notify that they have been obliged to increase the price of their commercial motor chassis to £750, delivered at works, as from December 16.

Morecambe Tramway Extension.—Alderman William Wright, in returning thanks for his election as mayor, mentioned that one of the necessary improvements was the adoption of mechanical traction on the tramways, which it was desirable should be extended beyond the borough boundaries.

A Yorkshire Extension.—A conference is to be held between Halifax, Hebden Bridge, and Todmorden Councils to discuss the joining up of the tramway from Leeds and Halifax with the motor omnibuses at the Todmorden boundary. The extension would give a through service from Leeds to Liverpool.

New Demands at Manchester.—A mass meeting of employees of the Manchester and Salford Tramways, Car Works, and Electricity departments is to be held in Salford on Sunday afternoon to discuss the question of a forty-eight hours week, free tram rides, and time and a quarter for all employees called on to work on holidays.

Edinburgh Tramway Employees.—Friendly negotiations are proceeding between the Edinburgh and District Tramway Company and their employees with reference to demands which include an increase of 1½d. per hour and the restoration of free travelling passes. It is expected that a satisfactory settlement will be announced on Saturday.

Scope of New Trade Associations.—Dr. Addison, the Minister of Reconstruction, will speak at the Manchester Reform Club on December 4, and is expected to deal with the nature of the Trade Associations necessary for the post-war development of output and improvement of trade, together with their relationship to the Whitley Councils.

L.C.C. Tramcar on Fire.—Owing to some defect in the plough an electric car of the London County Council tramways fully loaded with passengers caught fire on November 21, while passing along the Victoria Embankment. The car was stopped, and all the passengers hastily alighted. Firemen were called out and soon extinguished the flames.

Wages Advanced at Hull.—Hull Tramways Committee have granted their men an additional bonus of 5s. 6d., bringing their increase up to 12s. The advance to women is 3s., making their total bonus 7s. These increases involve a yearly expenditure of £7,500, and the Chairman has stated that it will bring the undertaking to the border line of profit and loss.

Obstructing Tramway Cars.—A warning to carters was given at the Aberdeen Police Court on November 27. A driver left a horse in a lorry unattended, as a result of which a tramcar was obstructed. He pleaded guilty. Bailie Beveridge, in imposing a fine, said that carters must pay more attention to tramcars, as any obstruction not only delayed the cars, but lage numbers of passengers.

Institute of Metals.—The Hon. Sir Charles Parsons will deliver the eighth annual May lecture next spring. The lecture will deal with the "Formation of Diamonds." The lecturer, who for over thirty years has been experimenting with the production of artificial diamonds, will give an account of his researches, which have an important bearing on many branches of applied science.

Building Regulation.—A new Defence of the Realm regulation is expected at an early date prohibiting any form of constructional work without the express permission of the Government. Existing regulations have hitherto required a permit only in respect of work costing more than £500, but in view of the pressing need for men it is necessary to ensure that no avoidable work should be undertaken.

Control of Horse Transport.—In consequence of the increasing demands of the Army and of agriculture upon the horse stock of the country, it is proposed to regulate the sale, purchase, distributio and working of all horses. other than Army and agricultural horses, and generally to exercise control over such horse stock. Mr. R. H. Selbie has been appointed for this work Controller of Horse Transport.

Rotherham Corporation Bill.—In Session of 1918, Rotherham Corporation will introduce into Parliament a Bill for the transfer of the electricity undertakings of the Mexborough and Swinton Tramways Company in Rawmarsh and Swinton, extension of area for the supply of electricity, the acquisition of neighbouring electricity undertakings and the purchase of coke ovens and crude gas and heat.

London Traffic Facilities.—Mr. Wardle, replying to a question by Major Newman in the House of Commons on November 28, said he understood that the services on the London underground railways had not been reduced, but on the contrary had been substantially increased during the war. He regretted that it was not possible at the moment to increase the supply of petrol for omnibuses.

Car Lighting in London.—The lamps in the upper decks of tramcars in London have now been partly painted over, after having been entirely unobscured during the greater part of this year. The obscuration, however, is not so drastic as was formerly the case. This year, when notifications of raids have been received, the cars have run in total darkness save for the two headlights and the rear red light.

Liverpool Boys' Audacity.—The Stipendiary magistrate at Liverpool has ordered birchings to be given to twenty boys charged with stealing lamps from tramcars. During the absence of the conductors upstairs, boys have jumped on to the rear platforms and stolen the electric lamps used for throwing light on the track. The lamps they have thrown violently to the ground, in imitation of bomb throwing.

Inconveniences of Dead Ends.—The disorderly scenes that take place at the terminus of the London County Council tramways at Victoria are causing complaint. It has been suggested that much of the trouble would be avoided if the dead end were converted into a loop, and it was stated at a meeting of the London County Council on Tuesday, that a scheme for this purpose was being considered.

Prices of Petrol.—The Pool Board (Petroleum Supplies) on November 26 reduced the price of all grades of war motor spirit, owing to the further reduction on the Government war risk insurance on vessels. The new wholesale prices effect a reduction of 2d. in the retail prices to the public. The current prices are now as follows:—No. 2 war motor spirit, 3s. 7d. a gallon. No. 3 war motor spirit, 3s. 6d. a gallon. In Scotland and Ireland the price is 1d. additional.

Proposed Purchase of Dundee's Railless Cars.—The deputy chairman of Halifax Tramways Committee, the traffic manager, and the tramways engineer, have been authorised to visit Dundee to inspect two railless trolley cars which the committee propose to purchase. Dundee Tramways Committee discontinued the railless trolley service some years ago in consequence of the Corporation refusing to sanction a scheme for resurfacing the roadway used by the cars.

A Yorkshire Light Railway Scheme.—The *Yorkshire Observer* reports that a proposal is being put forward to construct a light railway from Longridge to Hellifield. Eight stations are suggested which would provide facilities for scattered districts. If carried out, the proposal would greatly assist in the development of the area. Application for an order is to be made to the Light Railway Commissioners this month, but work could not be undertaken until after the war.

Tramways and Light Railways Association.—The Journal of this Association for November contains a statement with reference to the Tramways Committee that has been appointed by the Board of Trade (particulars of which have already appeared in our columns), Colonel Pringle's report on the Dover accident, and the report of the hearing of the case of the Postmaster-General *v.* the Blackpool and Fleetwood Tramroad Company in the Blackpool County Court on November 7. A summary of the proceedings in the case is given in this issue.

Gas Traction for Motor Cars.—*The Times* says that the Government are considering the situation that has arisen owing to the substitution of gas for petrol, and it is probable that the use of gas will be forbidden to the owners of all cars to whom a petrol licence has been refused. The object of the restriction will be to curtail unnecessary labour required for conversion of petrol cars to gas-driven vehicles. One large firm is said to have orders enough in hand to occupy it for two years.

The Gale in the North.—During the gale that swept over the North of England on Friday night and Saturday, November 23 and 24, it is estimated that the wind attained a velocity of about 50 miles an hour. The gale was particularly severe in Leeds and Bradford, and several tramcars were derailed, fortunately without injury to the passengers. In one case a strong gust of wind derailed a car and caused it to swerve right across the road into a boundary wall. In Blackpool the velocity of the wind reached over 80 miles an hour, and great seas submerged the promenade. At Bispham Cliffs, further portions of the cliffs were wrenched away, leaving the track at one point only 8 or 9 yards from the brink. The tramway service in Falkirk and district was disorganised for two hours. The corrugated iron roofing of the Scottish Central Electric sub-station and the tram sheds at Lambeth Road was blown off, and tramway and telephone wires were blown down.

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Bradford Car Lights.—Complaints continue to be made in the local newspapers of the shading of the lights in the tramway cars. It is pointed out that it is no longer necessary to keep the blinds down in the railway carriages, and that in cases of threatened attacks by aircraft the current can at once be cut off from the cars, thus extinguishing the lights. Clearly, if trains may run across the country fully lighted, tramway cars, the lighting of which is centrally controlled, should also be allowed to run without shades.

Edinburgh—Queensferry Project.—At the next meeting of Edinburgh Corporation the Tramways Committee will be asked to open negotiations with the owners of land on the route of the proposed tramway to South Queensferry to ascertain on what terms they would supply the land required for the track to be laid or for any roads that might be required, and also to negotiate with the county authorities in regard to roads and bridges on the route, and to report to the Council not later than the first meeting in January.

Experimental Air Mail Fleet.—Colonel Mervyn O'Gorman, consulting engineer to the Director-General of Military Aeronautics, and formerly superintendent of the Royal Aircraft Factory, lecturing before the Royal Society of Arts on Wednesday, said that the great air problem would be to bridge the hiatus between the cessation of aeroplane manufacture for war purposes and the starting of a commercial air fleet. The Government should now liberate a few machines and some pilots to initiate a mail and package carrying service.

Non-Payment of Fares.—At Royton, on November 21, a woman passenger was fined 40s. for attempting to avoid payment of her tramway fare, and a woman conductor was fined a similar amount for aiding and abetting. For the Manchester Corporation it was stated that the women conductors showed much negligence, and in some cases actually connived at the offence. Both women denied the charge, but the inspector said it was well known that the woman passenger frequently rode on the conductor's car without paying any fare

Government and Labour.—The War Cabinet have appointed a Committee, which will be known as the Government Labour Committee, to deal with the question of wages. The Committee will consist of the following:—The Rt. Hon. G. N. Barnes, M.P. (Chairman); Sir Auckland Geddes, K.C.B., M.P. (Vice-Chairman); Sir George Askwith, K.C.B., K.C.; Mr. Guy Calthrop; Sir Lynden Macassey, K.B.E.; Mr. I. H. Mitchell, and Mr. U. Wolff. Pending the appointment of a secretary communications should be addressed to the Ministry of Labour, Montagu House, S.W.1.

Motor Ambulances.—Sir George Touche, in thanking the subscribers in the city ward of Walbrook for the motor ambulance presented to the Red Cross Society, said that when the war began the British Army had no such thing as a motor ambulance. Some 500 were provided by the Red Cross Society, and the number now exceeded 2,000, in addition to lorries for conveying hospital stores, soup kitchens, and surgical cars. Including all these, the number of Red Cross vehicles was now 3,100. Each motor ambulance has apparatus capable of bringing up the temperature in the vehicle to 80 degrees.

American Railways and the War.—The United States War Board has decided to operate all railways east of Chicago. Railway facilities will be pooled, irrespective of ownership, the Government guaranteeing the shareholders the same dividends as before the war. The object of Government control is to obtain the maximum movement of goods. Each railway will receive orders for the handling of goods through a central body composed of the vice-presidents of the eastern railways, whom the Railway War Board has instructed to adopt all measures considered necessary to ensure the maximum of transportation.

The Institution of Automobile Engineers.—The third ordinary general meeting of the Institution of Automobile Engineers will be held at the Royal Society of Arts, John Street, Adelphi, W.C., on Wednesday, December 12, 1917, at 8 p.m., when Mr. A. E. L. Chorlton will read a paper entitled "The Agricultural Power Unit—some factors governing the design of a small tractor," a subject which should be of special interest at the present moment. Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution of Automobile Engineers, 28, Victoria Street, Westminster, S.W.1.

Railway Wages.—The railway "crisis" ended on Thursday, when a delegate meeting of the National Union of Railwaymen accepted the revised offer of the Companies' Executive for an advance of 6s. a week to men and 3s. a week to women and youths under 18 employed in the traffic department, and 5s. a week to men in the railway shops. The men asked for an increase of 10s. a week. The Companies' Executive offered 5s., which was refused. The advance of 6s. brings the flat rate war advance to men up to one guinea a week, and to women and boys 10s. 6d. The total cost to the railways is estimated at about £9,500,000.

Black Country Tramway Service.—The importance of maintaining tramway services throughout the Black Country was emphasised at the Smethwick Tribunal on November 26, when applications were heard with respect to 29 A men and 50 B1 men, employees in the tramway and omnibus service. Mr. W. G. Bond, general manager of the Birmingham and Midland Tramways Joint Committee, said that the company had given up hundreds of men and were now at the end of their resources. In reply to the chairman, Mr. Bond said that a district like the Black Country might be expected to benefit by the supervision of the National Tramways Committee which the Board of Trade had set up. Eventually the whole of the cases were adjourned in order that the functions of the Tramways Control Committee could be ascertained.

Edinburgh Corporation and a Tramway Manager.—In an editorial note the *Edinburgh Evening News* expresses regret that the City Council have not yet been asked to consider the appointment of a tramway manager at an early date. Our contemporary adds:—"The appointment cannot be delayed until such time as the Company's lease is expiring, for the new manager has his own plans to lay, his staff to gather, and questions of policy to discuss. Had the appointment been made ere now the Committee would have had at their elbow an expert whose advice would have been invaluable. It is not that the Committee have objected to the spending of money on advice. It is believed that when the bill for the report of the experts on the city system is tabled it will be found to run to between £1,200 and £1,500."

Tramway Service at Christmas.—At a meeting of Manchester Corporation tramway employees held on November 25, a resolution was passed confirming the previous decision by ballot to cease work on Christmas Day. A proviso was accepted, however, that if it is shown that certain munition workers have to work on Christmas Day, and representations to that effect are made through the Union, arrangements will be made to run a sufficient number of cars to serve such workers. The Tramways Committee had previously replied to the employees' application urging that they were entitled to a holiday in common with other workers, that in view of the public convenience they could not accede to the request that the tramway service in the city should be entirely suspended. Salford Tramways Committee have also declined to accede to the request of their employees that there should be a suspension of tramway services on Christmas Day. In view of the exceptional position enjoyed by tramway employees, it is only reasonable that they should be expected to carry on the services on holidays, when they are specially important to large masses of the people. Public service employees cannot to expect to have freedom on public holidays. Due recompense is made to them at other times, and officers of such associations as the Amalgamated Association of Tramway and Vehicle Workers should advise their members as to their duty. It would be unreasonable to deprive vast numbers of people of the opportunity of visiting their friends on Christmas Day, in order that the comparatively small number of tramway employees may observe that day as a holiday.

PERSONAL.

Lieut. H. W. Morgan, attached to the R.F.C., who was on the staff of the Liverpool Corporation tramways, was killed in action on November 8.

Sergeant T. Barclay, R.F.A., who has been awarded the Military Medal for bravery in the field, was previously employed in Glasgow Tramways department.

Mr. E. J. Elford, M.Inst.C.E., M.I.E.E., borough engineer of Southend-on-Sea, has been appointed city engineer of Cardiff, at a salary of £1,000 per annum.

Mr. H. Faraday Proctor on November 9 completed the twenty-fifth year of his service as engineer and general manager of the Bristol Corporation electricity department.

Mr. H. R. F. Mackay, city electrical engineer of Sydney, is visiting the United States and Canada, and in the course of his visit will inspect the principal electric supply undertakings in America.

Mr. E. L. Morgan has regretfully declined the position of city engineer of Cardiff, to which he was recently appointed. This decision has been taken owing to advice that the climate would be unfavourable to his wife's health.

Mr. W. Craufurd and **Mr. E. T. Holt,** engineering assistants in the tramways department of the London County Council, have been appointed assistant permanent way engineers at a commencing salary of £325, increasing by £25 annually to £400 a year.

Mr. C. W. Mallins, general manager of Liverpool Corporation Tramways, has, we regret to learn, sustained an injury to his knee by falling on the pavement owing to the lack of light. While the injury is not serious, it may prevent him from resuming his regular duties for some time.

Mr. Chalmers Kearney will lecture on "High Speed Railways After the War" before the Society of Engineers on Monday, December 3, at 5 p.m., at the Geological Institute, Burlington House, Piccadilly, W. Tickets may be obtained on application to the Secretary, Society of Engineers, 17, Victoria Street, London, S.W.1.

Mr. T. R. Whitehead, engineer and manager of Coventry Corporation tramways, has been granted an increase of salary from £600 to £700 per annum. Councillor Wale, chairman of the Tramways Committee, in recommending the increase to the Council, said that it was the unanimous recommendation of the members of the Committee, and alluded to the able services rendered by Mr. Whitehead in times of great difficulty.

Mr. J. H. Ellis has retired from the town clerkship of Plymouth, and has been added to the town's roll of Freemen, after nearly 27 years' service. Mr. Ellis performed valuable work in connection with the acquisition of the tramways by the Corporation, and again when the borough was enlarged by taking in Devonport, together with the undertaking of the Devonport and District Tramways Company. As the result of through running and the institution of the penny universal fare, the number of passengers for the first year of the combined undertaking has increased to 24,140,476, an addition of 4,000,000 above the last year of the disconnected system. The increase would have been still greater if war time conditions had allowed of a sufficiency of cars being obtained.

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Mr. Arthur Brown, city engineer of Nottingham, on November 21 completed fifty years' association with the Corporation. *The Nottingham Guardian*, in an appreciative notice of Mr. Brown's services, says that he has had a potent influence in the development of the city To mark the completion of his fifty years' work, the staff and employees of the engineering department have presented him with an address and a beautiful silver inkstand.

CONTRACTS AND ORDERS.

Crompton and Company have received an order from Grimsby Corporation for a motor generator and switchgear for charging accumulators on electric vehicles.

Electric Vehicles for Hampstead.—Hampstead Borough Council has purchased two electric motor vehicles fitted with Edison batteries for the use of the medical officer of health's department. The chassis have special van bodies.

L.C.C. Stores and Contracts.—The current contracts for the supply of general stores, with a few exceptions, will expire on December 31, 1917, and the Stores and Contracts Committee recently reported that they were taking steps to obtain supplies during 1918. This group of contracts, which ordinarily comprises 45 schedules, is the largest of the several groups dealt with each year, and includes such goods as metals, electric cables, lamps, fittings and materials, chemical and scientific goods, rubber and asbestos goods, leather, oilman's sundries, petrol, etc. It is proposed to continue the practice of buying certain classes of goods at current market prices or under special quotations until trade conditions again become normal, or the time is more favourable for new contracts to be entered into In other cases new forms of tender and schedules are being prepared. As the number of tenders would probably be comparatively large, the Committee thought it desirable, as in previous years, for the tenders to be opened by them instead of in the Council, and this was agreed to.

FINANCIAL REPORTS AND MEETINGS.

John Brown and Company, of Sheffield, have declared an interim dividend at the rate of 5 per cent. on the ordinary shares, less income-tax.

British Electric Traction Company.—The board announce a dividend at the rate of 6 per cent. per annum on the preference stock for the half-year ended September 30.

L.C.C Traffic Receipts.—The traffic receipts for the week ended November 28 amounted to £55,358, an increase of £9,991, as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to November 28 (thirty-four and a half weeks) the total receipts were £1,924,538, an increase of £247,085, on the corresponding period of 1916.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended November 17 give total receipts of £195,174 or £33,861 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £96 3s. 10d. per mile of single track, and last year at the rate of £79 10s. 0d., thus showing an increase for the week of £16 13s. 10d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

Overhead Fittings for Disposal.—The Burton and Ashby Light Railways announce in the Journal of the Tramways and Light Railways Association that they have for disposal fittings of high quality gun-metal which are available for sale owing to the company having adopted a different pattern of suspension. The unused fittings are as follows:—Double pull-offs, 34; single, 6; straight line hangers, 26; second-hand, double pull-offs, 76; single, 1; straight line hangers, 102. The double pull-offs weigh 5 lb. each, and measure 10 ins. between the centres of the eyes. The single pull-offs weigh 3 lb. each, and measure 5 ins. from centre of eye to insulating bolt hole. The straight line hangers weigh 2 lb. each. The pull-offs when purchased were submitted to a tensile stress of 1,000 lb., without showing any permanent extension, and they were specified to be capable of standing a tensile stress of 4,500 lb. before fracturing. Applications should be made to Mr. F. H. Ward, General Stores Department, Derby.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH Nov. 29 or previous.	A WEEK AGO.
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	71	70½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	58/9	60/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4⅛	58/-	50/-
4%	4%	Do. 4% Deb.	100	91	70/-	70
4½%	4½%	Do. 4½% Deb.	100	98½	69¾	71
5%	5%	Do. 5% Deb.	100	96	69¾	67
—	—	Associated Omnibus Co., Ord. ..	5/-	3/16	1/3	1/3
1/-	7d.	Auckland Elec. Trams. Ord. ..	1	1 3/16	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	105	104
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	3/16	10/6	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	71½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77¼	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅛	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	45	44½
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	92	90
4/-	4/-	Brisbane Elec Trams. Ord. ..	5	7½	£6/15/9	£6/15/9
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	29½	29½
6%	5%	Do. Pref. Ord.	100	106	29	29
5%	5%	Do. 5% Cum. Pref. ..	100	103	42½	42½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99⅛	82⅝	82⅝
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96⅛	57⅛	57⅛
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	34½	34
6%	6%	Do. 6% Cum. Part. Pref.	100	—	74½	74½
5%	5%	Do. 5% Deb.	100	92	75	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65½	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	73	73
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	7	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99⅛	74	73½
1/-*	1/-*	Cape Elec. Trams.	1	1 1/16	11/5	11/5
1/3	1/3	City of B. A. Trams	5	5½	82/6	82/6
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	81¼	81¼
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7¼	7¼
6/-	6/-	Do. 6% Pref.	10	12	10 13/16	10 13/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	1/16	-/9	1/0¾
1/2⅜*	1/2⅜*	Do. 6% Cum. Pref. ..	1	3/16	9/3	10/-
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	3/16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	80½	79½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44⅜
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 1/16	9 1/16
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	71
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79⅛	79⅛
9⅜d.*	9⅜d.*	Llandudno & Colwyn B. Ord.	1	—	10/-	10/-
—	1½d.	London & Sub. Traction Ord. ..	1	3/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	3/16	7/-	7/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81½	80½
5%	5%	Do. 5% Inc. Deb.	100	88½	78	78½
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	36	35½
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%	9½d.*	Manaos Trams & Ltg. Ord. ..	1	1/16	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	70½	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1¼	$1¼	Mexico Trams. Common ..	$100	70	32½	32½
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	88½	88½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2²*	2/-	National Steam Car	1	3/16	19/9	19/9
9½d.*	9½d.*	New General Traction	1	⅛	7/3	7/3
8½d.	6d.	Northern Gen. Trans. Ord. ..	1	3/16	12/9½	12/9½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	81/3	80/3
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	6/6	6/9
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/-	12/6
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	3/16	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	3/16	11/4½	11/-
4/4	8d.	Provincial Trams. Ord. ..	1	⅜	19/9	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	87½	86¾
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	76½	75
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89	89
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74¾	74¾
12/-	10/-	Shanghai Elec. Cons.	10	13	14⅜	14⅜
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/7	4/7
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77⅛	77⅛
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	66
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	¾	84/7½	84/7½
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21⅞	15½	15½
—	—	Undgd. Elec. Rys. of London ..	10	21⅛	33/1½	33/9
		Do. "A"	1/-	⅜	5/6	5/3
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102½	102¾
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	103	102½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	81⅞	82½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Nov. 20	363	443	+ 80	33	14,764	+ 1,385
Aberdeen Corporation ..	,, 21	1,770	2,012	+ 242	25	54,526	+ 6,051
Ayr Corporation ..	,, 24	262	335	+ 73	28	14,467	+ 1,491
Belfast City	,, 23	5,565	6,985	+ 1,420	34	218,645	+ 24,664
Birkenhead Corporation	,, 25	1,514	1,832	+ 318	34½	62,932	+ 9,527
Birmingham Corporation	,, 24	12,618	19,550	+ 6,932	34	624,841	+ 74,315
do. Motor Omnibuses ..	,, 24	1,069	1,215	+ 146	34	35,724	+ 1,177
Blackburn Corporation ..	,, 21	1,021	1,328	+ 307	34½	51,934	+ 7,966
Blackpool & Fleetwood ..	,, 17	297	379	+ 82	43	41,623	+ 497
Bournemouth Corporation	,, 28	1,891	2,291	+ 400	34¼	90,724	+ 7,578
Bradford Corporation ..	,, 17	6,263	7,478	+ 1,215	33	256,745	+ 26,923
Bristol	,, 23	4,461	5,492	+ 1,031	47	255,386	+ 24,339
Burnley Corporation ..	,, 24	1,522	1,821	+ 299	..	..	..
Burton-on-Trent Cor. ..	,, 25	263	325	+ 62	34	10,624	+ 1,064
Bury Corporation ..	,, 23	1,223	1,508	+ 285	34½	57,282	+ 7,170
Chatham & District ..	,, 22	1,049	1,260	+ 211	47	60,125	+ 2,064
Cork Electric ..	,, 22	458	572	+ 114	47	25,918	+ 1,828
Derby Corporation ..	,, 24	1,008	1,258	+ 249	34	41,523	+ 2,137
Dublin United ..	,, 23	5,830	6,865	+ 1,035	47	315,935	+ 30,240
Dundee City	,, 21	1,326	1,535	+ 209	27⅔	42,370	+ 3,958
East Ham Corporation ..	,, 24	1,101	1,312	+ 211	34	47,882	+ 2,899
Exeter Corporation ..	,, 17	388	373	— 15	34	13,972	— 87
Glasgow Corporation ..	,, 24	23,246	26,788	+ 3,542	25⅔	671,984	+ 76,906
Glossop (U.E. Sup. Co.) ..	,, 24	134	173	+ 39	47	7,271	+ 727
Halifax Corporation ..	,, 20	1,774	2,312	+ 538	33⅓	84,446	+ 7,391
do. Motor Buses ..	,, 20	44	50	+ 6	33⅓	1,646	— 49
Hastings and District ..	,, 25	728	1,012	+ 284	47	58,757	+ 9,486
Huddersfield Corporation	,, 24	2,512	3,215	+ 703	34	109,904	+ 11,489
Hull Corporation ..	Sept. 29	2,979	3,559	+ 580	26	88,862	+ 6,652
Ilford U.D. Council ..	Nov. 24	599	742	+ 143	34	26,258	+ 2,748
Ipswich Corporation ..	,, 24	396	574	+ 178	34	23,718	+ 5,508
Isle of Thanet ..	,, 24	235	150	— 85	8	1,323	— 946
Kilmarnock Corporation	,, 24	171	205	+ 34	27½	5,501	+ 567
Lanarkshire	,, 22	2,166	2,896	+ 730	47	130,309	+ 21,307
Lancashire United ..	,, 21	1,674	2,483	+ 809	47	110,560	+ 24,547
Leeds City	,, 24	9,146	11,006	+ 1,860	34	377,552	+ 39,833
Leicester Corporation ..	,, 24	3,307	4,064	+ 757	..	..	..
Leith Corporation ..	,, 24	811	1,047	+ 236	27½	29,965	+ 5,372
Leyton U.D. Council ..	,, 22	1,351	1,817	+ 466	34	64,508	+ 7,205
Liverpool Corporation ..	,, 24	13,676	16,498	+ 2,822	46⅔	731,471	+ 68,572
Llandudno & Colwyn Bay	,, 23	199	235	+ 36	51½	17,833	— 778
London County Council	,, 28	45,367	55,358	+ 9,991	34½	1,924,538	+ 247,035
Maidstone Corporation ..	,, 22	176	219	+ 43	34	8,410	+ 800
Manchester Corporation	,, 24	17,928	21,493	+ 3,565	34	705,840	+ 59,206
Nelson Corporation ..	,, 24	194	215	+ 21	34	8,051	+ 680
Newcastle-on-Tyne Cor.	,, 24	6,572	8,000	+ 1,428	34	268,042	+ 38,674
New St. Helens & Dist. ..	,, 21	922	1,254	+ 332	21	31,144	+ 7,534
Northampton Cor. ..	,, 23	720	865	+ 145	33	28,636	+ 4,040
Nottingham Corporation	,, 22	3,608	4,625	+ 1,017	34	150,533	+ 15,729
Oldham Corporation ..	,, 25	2,227	2,733	+ 506	35	99,754	+ 12,071
Portsmouth Corporation	,, 24	2,163	2,550	+ 387	..	..	..
Provincial	,, 24	1,866	2,291	+ 425	7⅔	18,347	+ 1,959
Reading Corporation ..	,, 22	802	1,044	+ 242	34½	36,030	+ 6,589
Rhondda Tramways ..	,, 15	1,297	1,569	+ 272	46	69,122	+ 9,834
Rotherham Corporation	,, 28	1,640	1,896	+ 296	34½	62,701	+ 8,423
Salford Corporation ..	,, 26	5,164	6,541	+ 1,377	34⅔	228,386	+ 38,062
Sheffield Corporation ..	,, 25	10,585	12,484	+ 1,899	35	421,229	+ 50,318
Southampton Cor. ..	,, 21	1,512	2,011	+ 498	33⅓	69,477	+ 11,923
Southend-on-Sea Cor. ..	Oct. 31	699	583	— 116	31	30,698	— 919
South Shields Cor. ..	Nov. 24	805	953	+ 148	34	32,597	+ 3,672
Sunderland Corporation ..	,, 25	1,627	1,838	+ 211	34	62,411	+ 5,491
Sunderland District ..	,, 14	644	756	+ 112	3	1,549	+ 259
Swindon Corporation ..	,, 21	192	258	+ 66	33¼	9,218	+ 2,209
Torquay Tramways ..	,, 15	490	672	+ 181	46	30,759	+ 3,045
Tyneside Trys. & Trmrds.	,, 7	589	806	+ 217	19	17,320	- 4,291
Wallasey Corporation	,, 24	1,149	1,428	+ 279	34½	54,952	+ 6,656
Walsall Corporation ..	,, 24	747	1,037	+ 290	34	33,537	+ 4,737
Walthamstow U.D. Coun.	,, 24	915	1,152	+ 237	34	42,654	+ 4,485
Warrington Corporation	,, 22	491	674	+ 183	34	18,806	+ 1,861
West Ham Corporation	,, 22	2,781	3,659	+ 878	33⅔	124,515	+ 13,869
Wigan Corporation ..	,, 22	1,647	2,153	+ 506	34	67,904	+ 10,072
Yorkshire (West Riding)	,, 25	1,675	2,213	+ 538	47	100,076	+ 17,961

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War :—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Nov. 25	£52,241	£54,384	47	£2,438,833	+ £36,852
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo (4 wks)	Sept. 9	2,850	2,816	24	18,553	— 167
Brazilian Traction (Mlrs.)	Sept.	7,138,000	7,625,000	39	68,430,000	+ 5,279,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Sept.	414,811	457,709	13	1,350,512	+ 100,116
Buenos Aires Lacroze ..	Oct.	39,670	39,067	17	149,879	— 1,737
Burmah Tram. & Light Rs.	Oct.	29,768	28,955	13	81,837	+ 3,907
Calcutta .. .. Rs.	Nov. 24	73,379	68,640	47	3,195,377	+ 612
Cape Town	Oct.	14,238	17,128	..	..	..
Carthagena and Herrerias	Oct.	2,539	2,805	43	41,210	+ 16,071
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
Costa Rica	Feb.	3,500	2,903	..	..	..
East India	Oct.	2,080	1,229	13	4,303	— 2,822
Hong Kong .. .. $	Sept. 22	13,970	14,080	38	513,646	— 41,551
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Oct.	4,434	4,069	43	40,615	— 1,441
Lima	Oct.	33,303	37,537	43	359,732	+ 22,341
Lisbon .. .. Escu	Sept.	194,276	228,097	..	..	..
Madras .. .. Rs.	Nov. 15	31,596	35,433	45	731,648	+ 66,142
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	Sept.	141,286	157,761	..	..	..
Montevideo	Oct.	28,729	30,153	52	359,832	+ 12,060
Pernambuco	Nov. 18	3,555	4,279	45	176,095	+ 35,048
Peruvian .. .. $	Oct.	945,590	1,047,220	17	3,952,390	+ 363,560
Port Elizabeth	Oct.	3,131	3,885	..	..	..
Rangoon	Oct.	5,043	5,667	43	50,021	+ 3,650
Shanghai .. .. $	Aug. 22	21,712	22,369	..	..	..
Singapore .. .. $	Oct. 6	13,629	13,420	40	517,304	+ 13,174
Toronto .. .. $	Sept.	913,535	1,023,517	39	8,891,112	+ 885,348
Winnipeg .. .. $	Sept.	267,497	267,170	39	2,431,794	— 29,660

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

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Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BOLTON.

Electricity Department.

The Electricity Committee of the Bolton Corporation invite tenders for the supply, delivery and erection of the following plant at their Generating Station, Back-o'-th-Bank, Bolton:—

One 7,500-kw. Turbo-Alternator with Condensing Plant.

Specification and form of tender may be obtained from Mr. W. J. H. Wood, Borough Electrical Engineer, Back-o'-th-Bank, Bolton, on receipt of a deposit of one guinea, which deposit will be returned on receipt of a *bona fide* tender.

Sealed tenders on the prescribed form, endorsed "Tender for Turbo-Alternator," must be delivered to me not later than 12 o'clock noon, January 15, 1918, addressed to the Chairman of the Electricity Committee.

The acceptance of any tender will be subject to the sanction of the Local Government Board being obtained for the necessary loan.

The Corporation do not bind themselves to accept the lowest or any tender.

Town Hall, Bolton, December, 1917. — SAMUEL PARKER, Town Clerk.

COUNTY BOROUGH OF SOUTHAMPTON.

Electrical Plant.

The Corporation invite tenders for the supply and delivery of a Turbo-Alternator, a Motor Generator and a Boiler, to their Electricity Supply Station. Specifications, conditions and further particulars may be obtained of the Borough Electrical Engineer.

Sealed tenders, suitably endorsed, must be sent to the Town Clerk. No pledge is given to accept the lowest or any tender.

Town Clerk's Office, Municipal Offices, Southampton. December 3, 1917. — R. R. LINTHORNE, Town Clerk.

POSITIONS VACANT.

COUNTY BOROUGH OF BARNSLEY.

Electricity Department.

Switchboard Attendant.

Wanted, Junior Shift Engineer, experienced in E.H.T., A.C., and L.T.D.C., 3-wire supply, with rotary converters.

State age, training, experience and salary required, also date when able to commence duties.

Applications, accompanied by not more than three testimonials, to be addressed to T.W. Hibbert, acting Borough Electrical Engineer, Electricity Works, Barnsley.

December 5, 1917. — W. P. DONALD, Town Clerk.

TICKET INSPECTOR.

Ticket Inspector required for Motor Bus Services. Age 25-35, ineligible. State age, experience, and wages required. Permanent position to suitable man. One with knowledge of Commercial Motors preferred.—Apply, TRAMWAYS COMPANY, Oxford.

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPARTMENT.

Appointment of Chief Assistant.

Applications are invited for the post of Chief Assistant Electrical Engineer in this department. The position will be that of Chief Assistant to the City Electrical Engineer, chiefly in connection with generation and distribution. Applicants should have experience in the generation and distribution of both high tension, three-phase, and low-tension, direct-current, including sub-station work. The salary is £750 per annum.

Forms of application and statement of duties can be obtained on application to the Secretary of the Electric Supply Department. These should be filled in by each applicant, and, accompanied by copies only of not more than three testimonials as to experience, ability and character, should be sent to

THE CHAIRMAN,
The Electric Supply Committee,
14, Dale End, Birmingham,

the envelope endorsed "Appointment of Chief Assistant." They must reach this office not later than 12 noon on Monday, December 17, 1917.

Canvassing, either directly or indirectly, will disqualify.

Electric Supply Offices, 14, Dale End, Birmingham. December 1, 1917. — R. A. CHATTOCK, City Electrical Engineer.

POSITION WANTED.

TRAFFIC INSPECTOR.

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SATURDAY DECEMBER 8, 1917.

SCOTLAND AND THE NATIONAL TRAMWAY COMMITTEE.

In another column we reproduce from the *Glasgow Herald* a forcible plea that Scotland should be represented on the National Committee of Tramway Managers which has been appointed to supply the needs in respect of materials and labour of tramways essential to the prosecution of the war. Complaint has also reached us from other quarters. There certainly seems to be good reason for the claim from the north. Local conditions in Scotland differ considerably from those in England. The districts represented by the present members of the Committee are simply London, the west of Yorkshire, and the south of Lancashire. The number of tramway undertakings in Scotland is not very large, but several of the systems are very important, that of Glasgow coming second in the United Kingdom. From the point of view of tramways essential to the prosecution of the war, the Scottish undertakings are specially important, and this is notably the case in connection with those in the west of Scotland. The magnitude of the business of carrying workers whose industry is necessary for the prosecution of the war which is conducted by the tramways of Glasgow, Paisley, Lanarkshire, Dumbartonshire, and Greenock, is amazing. One suggestion which has been made is that a Scottish municipal representative and a Scottish company representative should be added to the Committee. From what we have gathered, there is no doubt that a strong feeling exists among Scottish tramwaymen on the subject. In addition to the argument that the demand is just, it must be remembered that Scottish *amour propre* is touched, and the perennial grievance that Englishmen refer to Great Britain as England is again stirred up and flames anew. If no heed is paid to the Scottish demand, it will not be surprising to hear that the men in the north will believe that the members of the Committee will look in the first place to English interests and will not always succeed in remembering that there is such a place as Scotland. The subject has this week been under the consideration of Glasgow Tramways Committee and also of a meeting of Scottish tramway managers, and they have determined to approach the Board of Trade on the matter. There is little doubt that if the Board of Trade do not appoint or request the Scottish tramway authorities to appoint at least one Scottish representative, the path of the Committee will not be so smooth as it otherwise would be. Grievances and criticism from the men of the north will not help the men of the south in what must sometimes be an invidious task. Let the Board of Trade be wise in time.

NATIONAL TRAMWAYS COMMITTEE.

The action of the Board of Trade in connection with the appointment of the National Tramways Committee is meeting with criticism in certain quarters. There is a feeling in some town councils that municipal interests have been given insufficient representation on the Committee; and, as reported in last week's issue, the London County Council, while assenting to the scheme, have expressed dissatisfaction at the selection of a chairman who is connected with tramway companies.

The *Glasgow Herald*, commenting editorially in a recent issue, complains that no one resident in Scotland or connected with Scottish tramways has been appointed on the Committee, which it regards as absurd. In the public interests our contemporary thinks that it is desirable that at least one member with a knowledge of local requirements should represent Scottish interests. It is pointed out that Glasgow possesses by far the largest tramway undertaking in Scotland, and next to the London County Council system, the largest in the United Kingdom. It is asked why Mr. Dalrymple, Glasgow's tramway manager, has not been made a member of the Committee; and Scottish Members of Parliament are called on to devote a little more of their energy to the pursuance of practical matters such as this.

THE COMMITTEE GIVE THEIR SERVICES GRATUITOUSLY.

In the House of Commons on December 3, Mr. Gilbert asked the President of the Board of Trade whether the chairman of the new Tramway Commission was a salaried appointment; and if so, what salary would be paid; whether the other members of the Commission would also be paid; and, if so, at what rate?

Mr. Wardle: It is not proposed to pay salaries to the chairman or the members of the Committee, who will give their services free

PROTESTS FROM SCOTLAND.

In connection with the appointment of the National Tramways Commission, the Glasgow Corporation Tramways Committee have appointed the convener (Mr. Montgomery) and the conveners of the sub-committees, with powers, to take steps, in conjunction with other tramways authorities in Scotland, to impress upon the Board of Trade the necessity for Scotland being represented on the Tramways Committee.

Direct representation of Scotland on the National Tramways Committee was claimed by the Scottish Tramway Officials Association at a meeting held in Stirling on Thursday. On the motion of Major Coutts, general manager of Paisley District Tramways Company, a resolution was unanimously adopted pointing out that there is no member directly representing Scottish Tramway undertakings who is resident in Scotland, and that owing to the large number of munition workers carried on these tramways, apart from the ordinary public convenience, this would be detrimental to national interests, and urging that Scottish interests should be directly represented. Mr. Dalrymple, of Glasgow, and Major Coutts were appointed as a committee to meet the Board of Trade if practicable.

CHRISTMAS DAY CAR SERVICES.

When a motion was made at Maidstone Council meeting that no cars should be run on Christmas Day, but that the employees should be paid the usual wages, the town clerk pointed out that the Council, under their Light Railway Order, were compelled to provide such service of cars as might be reasonably required in the public interest. There was a penalty of £5 for every day they failed to comply with this requirement, and the £5 would have to be paid by members of the Council if voting for the resolution. After some discussion, the motion was negatived.

Newcastle Tramways Committee, in compliance with a request from the men's society asking to be relieved from duty on Christmas Day, have decided not to run cars on that day.

Leeds Tramways Committee propose to run the usual service of cars on Christmas Day, which is the same as the service running on Sundays. Arrangements are also being made to run extra cars on the more popular routes as the circumstances warrant. A request had been received from the Tramwaymen's Union that the services should be discontinued. The employees will receive, as in previous years, double pay for Christmas Day work.

Salford tramway employees have decided by 620 votes to 6 not to work on Christmas Day. Conferences are being arranged, and it is hoped that a certain number of cars will be run for the benefit of munition workers.

Burnley and Blackburn Tramway Committees have both decided not to accede to the request by the local branches of the Association of Tramway and Vehicle Workers that the tramway services should be suspended on Christmas Day.

Halifax Tramways Committee has granted the request of the Amalgamated Association of Tramway and Vehicle Workers that a complete holiday should be given to the staff on Christmas Day.

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MISCELLANEOUS NEWS AND NOTES.

Increased Railless Car Fares.—Keighley Tramways Committee recommend an increase in the fares on the railless car routes from December 8.

Curtailment of Routes.—York Tramways department are preparing a scheme for the curtailment of the running of cars to the ends of some of the routes.

Station Extension at Swansea.—Swansea Tramways and Electricity Committee recommend that sanction of the Local Government Board be asked to spend £39,000 on extensions at the electricity station.

Price of Tramway Service for Haslingden.—Accrington Tramways and Electricity Committee have decided to charge the Haslingden Corporation 5d. per car mile during the current year for the tramway service supplied to the latter authority.

Future of Grimsby Tramways.—A sub-committee has been appointed by the Grimsby Corporation to consider their future action in regard to the tramways. The Council's agreement with the Great Grimsby Street Tramways Company expires in 1921.

Kirkcaldy Employees Applications.—The Electric Lighting and Tramways Committee have refused the application of the tramway employees made through their union for a reduction of working hours from 60 to 54 per week, and for time and a half payment for overtime.

Light Railway Extension at Newport.—Lieutenant-Colonel Druitt, R.E., has, on behalf of the Board of Trade, inspected a new light railway at Newport (Mon.) which runs from Pill Gates to the entrance to Alexandra Dock. The line is an extension of the Corporation's tramway system.

The Metric System.—There will be a discussion at the meeting of the Institution of Electrical Engineers, to be held at the Institution of Civil Engineers, Great George Street, Westminster, S.W., on Thursday, December 13, at 6 p.m., on the metric system, which will be introduced by papers by Mr. L. B. Atkinson and Mr. A. J Stubbs.

Institution of Electrical Engineers.—The disciplinary matter which has occasioned so much and somewhat acrimonious discussion was considered at a recent meeting of corporate members, but has not yet been determined. It is somewhat curious that it should have been proposed to remove a member from the rolls by the use of proxies.

Payment on Entry in York Omnibuses.—A petrol-propelled omnibus recently purchased by York Tramways department has been converted to gas traction, as petrol is not available. The fare is one penny on the payment on entry system, which obviates the use of tickets and reduces the necessity of inspection to a minimum.

Locomotive Drivers' Wages Increased.—The Amalgamated Society of Locomotive Engineers and Firemen has reported that the Committee on Production has agreed to grant drivers and firemen the same increase—viz., 6s. per week - as was awarded last week to other grades of railwaymen. They had previously been granted 5s. The extra 1s. affects drivers and firemen on all systems throughout the country.

Damages Awarded to a Motorman's Widow.—An Assize jury has awarded £500 damages to the widow of a Huddersfield tramway motorman who was killed as the result of a collision between his car and a G.N.R. lorry. The case was originally tried at the July Assizes, when the jury disagreed. At the Michaelmas Assizes, on *November* 30, the parties agreed to the amount of damages stated, and judgment was given accordingly.

Non-payment of Fares. In a reference made in last week's issue to a charge at Royton against a woman for non-payment of fares, it was inadvertently stated that the case was brought by the Manchester Corporation. The case was brought by the Oldham Corporation, and the fine inflicted on the woman passenger and conductor concerned was 20s. each. Both women denied the charge, but the inspector said it was well known that the woman passenger frequently rode on the car without paying any fare.

Overturned Car at Glasgow.—A serious accident occurred at Glasgow on Wednesday night, when a double deck electric car ran off the rails at the sharp curve at the Victoria Road Gate, opposite Queen's Park, crashed through some iron railings, and overturned. There were fifty passengers, mostly munition workers. Two persons were killed and more than thirty injured, twelve of them very seriously. The motorman, who was a youth aged sixteen was apprehended and remanded at the police court for forty-eight hours, pending further inquiries. He was released on Friday without bail.

Tramway Finance and Increased Wages.— Mr. Irwin, in moving the adoption at a meeting of Glasgow Corporation of minutes of a Special Committee on conditions of service, made a general statement in the course of which he referred to the tramway department. He said that the tramway manager anticipated that the cost to that department of the 12½ per cent. bonus granted by the Minister of Munitions and the 5s. awarded by the Committee on Production, would be something like £100,000. Some regard must be had in the near future to the trend of events. Treasurer Barrie said that the Corporation were hopeful that as time went on they would be able to repay the £2,000,000 which they had invested in war loan from the surpluses on the tramway working. If the bonuses and increases were to be added on to the tramways department there would be no surplus. In fact, if the figures turned out as some people thought there would be a deficiency. Where the money to pay off the money borrowed for the £2,000,000 war loan was to come from would have to be seriously considered shortly.

Stealing Tram Tickets.—At Nottingham Children's Court recently it was stated that on some of the tramway routes it was a common practice for lads to jump on the cars while the conductors were on the upper deck, steal a quantity of tickets, and jump off again. Two lads were each ordered to pay 2s. 6d. costs for stealing 400 tickets.

More Bristol Tramways Employees Join the Forces.—The Bristol Tribunal recently had before them 450 employees of the Bristol Tramways Company. The National Service authorities had made inquiries concerning the actual work that the men of military age were engaged upon, and the call for certain men was pressed. The Tribunal decided that 39 men must join the colours. These included two taxi-drivers, two inspectors, an omnibus driver, the secretary of the provident society, fitters' assistants, and coach painters. The remainder of the employees were given temporary exemption.

Parcels by Tram Car.—The Government department responsible for the co-ordination of road transport has asked the tramway undertakings in many of the large cities whether greater use cannot be made of the tramway cars for the conveyance of parcels. There is no doubt that the tramways can be made a valuable means of transportation for light goods service. Bradford Corporation, for instance, has a useful parcels delivery system which has been in operation for some years with much success. It was fully described in our issue of May 8 1913. The parcel and goods service carried on by the Birmingham and Midland Tramway Joint Committee was described with illustrations and forms for accounting, in THE TRAMWAY AND RAILWAY WORLD of March 11, 1915, and some further notes in regard to the service appeared in the issue of January 11, 1917.

Offences against Tramway By-Laws.—At Southampton, an aged man was summoned for a breach of the tramway by-laws by alighting from a car in motion. The conductor stated that he alighted while the car was going at top speed. Two passengers corroborated this statement, and Mr. Tuke Robson, the general manager, who was riding on the top of the car, also spoke to the car being suddenly stopped. Defendant said that the car stopped, and whilst he was alighting it moved on. His solicitor added that proceedings were not taken until after the Corporation had received a letter from defendant's wife to the effect that her husband had been severely shaken up by his fall, and she would hold the Corporation responsible if anything serious resulted. A fine of 10s. was imposed.—A cyclist at Liverpool was fined 2s. 6d. for having held on to a car whilst it was in motion.

Traffic Regulation in Leeds.—Leeds police have issued the following notice as to street traffic:—The attention of the general public, and particularly all drivers of vehicles, is called to the inauguration of a new method of directing traffic at several busy traffic points in Leeds during the hours of darkness. Special constables stationed to direct traffic at several of the traffic points are now supplied with an electric apparatus displaying three lights, viz.: A red light is carried on the constable's back, between the shoulders. This light is continually visible to traffic approaching from the rear of the constable, and indicates that the road is not clear. Two lights (one red and one white) are also carried in the hands of the constable. If the hand containing the white light is waved, it indicates that the road is clear for approaching traffic to proceed. If the hand containing the red light is waved, it indicates that the road is not clear, and drivers of approaching vehicles must not attempt to pass until the white light is displayed.

Contributory Negligence.—An interesting decision has been given by Sheriff Fyfe, Glasgow, in an action by James McGuigan against Glasgow Corporation for damages in respect of personal injuries. The pursuer's case was that while coming down the stairs of a tramway car, the driver drew up with such violence that several passengers also coming downstairs were knocked against him, and he was thrown on to the street, sustaining a fracture of the right arm. The Sheriff, in dismissing the action, said that the proximate cause of pursuer sustaining injury was, according to his own statement, that on his way down the stair he was thrown off the car by other passengers jostling him. This could not have happened if pursuer had been holding on to the stair rail or the upright stanchion. A passenger who came down a car stair without taking a grip of something obviously confessed himself guilty of contributory negligence. A car might stop suddenly or stop with a jerk at any moment for a great many good reasons, and this was a possibility which car passengers had to reckon with at all times.

London United Tramways.—Mr. James Devonshire, managing director of the company, in a statement with reference to the Bill now being promoted by the company, recently made to the Uxbridge Urban Council, alluded to the bad state of the track, and said that their effort to obtain rails both in England and America had been unsuccessful. It was necessary that they should increase fares, and they proposed to ask a penny a mile and a halfpenny for workmen, with a minimum of a penny. They desired also an extension of the period of purchase by the local authorities until 1960. The company were now paying wayleaves amounting to about £4,000 a year, and in their Parliamentary Bill they were seeking to be relieved of this payment. Mr. Devonshire said that the Uxbridge line had never paid, and they wished to abandon certain portions. They did not intend any of the concessions asked for to come into operation until after the war. The tramways would be put in order as soon as money and materials could be procured, and they hoped to obtain assistance from the Board of Trade in this respect.

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Edinburgh Tramwaymen's Wages.—A meeting of Edinburgh tramwaymen on December 1 endorsed the agreement between the directors of the company and the employees as respects wages. The present war bonus of 5s. a week will be converted into an increase of wages of 1½d. per hour for all male employees, and ½d. per hour for women conductors. All employees in the traffic department will be paid time and a half for overtime, and will have free travelling passes. The employees will have the option of working overtime on New Year's Day, and the car services will not start until 9 a.m.

An Expensive Accident.—In the Court of Session, Edinburgh, £75 damages and costs were awarded to the wife of a miner who claimed £250 for injuries sustained in a tramcar accident in Glasgow. She stated that at a stopping place she proceeded to alight from a tramcar, but before she reached the ground the car was suddenly started and she was thrown to the ground and dragged for several yards along the srreet. In defence it was stated that the pursuer attempted to alight after the car was restarted and while it was in motion. The Lord Ordinary stated that he preferred the story told by the pursuer's witnesses to that told by the defenders' witnesses as to the manner in which the accident happened.

Belfast Employees' Wages.—Belfast tramway employees have been awarded by the Committee on Production 3s. a week extra war wages, making 12s. a week as from September last. The Tramways Committee recommend that the award apply to all employees in the department, whether members of the Amalgamated Union of Labour or otherwise.—Bradford Tramways employees have rejected the offer of the War Wages Committee. They have further decided that if the City Council should approve the recommendation of the Committee, the Branch Committee be empowered to give twenty-one days' notice to the Committee on Production that a dispute is pending. The employees demand (1) an advance of £1 per week on pre-war rates, the same to be merged into wages instead of bonus; (2) double time for all time worked on Sundays and Bank Holidays; (3) equal pay for males and females engaged on the same class of work. The committee offered a further advance in bonus of 3s. per week for men and 2s. per week for women.

PERSONAL.

Mr. W. J. Cox has been appointed works manager at the Derby electricity works, at a salary of £240 per annum.

Sergeant T. Barclay, who has bee awarded the Military Medal, was formerly in the service of the Glasgow Corporation Tramways.

Mr. F. R. Hobley, mains engineer at Lowestoft Corporation Electricity Works, has been appointed electrical engineer to the New Van Mining Company, of Llanidloes, South Wales.

Mr. C. W. Mallins, general manager of Liverpool Tramways, has made good progress towards recovery from the sprained knee which he sustained not long ago. He recently attended at the office daily, using a cab.

Mr. J. W. Falkingham, of the Bradford Corporation tramways, has taken up a position with Messrs. Clayton and Shuttleworth, engineers, Lincoln. Mr. Falkingham is well-known to the members of the Municipal Tramways Association, with which body he has been closely associated for a number of years.

Mr. D. Robertson, stores clerk of Lanarkshire Tramways Company, has been presented with a pocket book and £15 by the staff and employees on his departure to join the colours. Mr. G. F. Moller, general manager, made the presentation at a social evening following a tea to which Mr. Robertson entertained the company.

Mr. Chalmers Kearney's lecture on "High Speed Railways after the War" before the Society of Engineers has been postponed from Monday, December 3, to Monday, December 17. The meeting will be held at the Geological Institute, Burlington House, Piccadilly, W. Tickets may be obtained from the Secretary, the Society of Engineers, 17, Victoria Street, S.W.1.

Motorman A. A. Allen, of the West Ham Corporation Tramways, has been granted the Military Cross for conspicuous service on October 4, when, after all other officers of his company were put out of action, he took charge and held the position for forty-eight hours. He was appointed to the rank of second-lieutenant in the 13th Royal Fusiliers in June last.

As a mark of appreciation of their services, silver rose bowls were presented to **Mr. Arthur Brown,** city engineer, of Nottingham, and **Mr. H. Talbot,** city electrical engineer, by Mr. R. H. Swain, chairman of the Electricity Committee, on behalf of Sir John Turney, a former chairman of the Committee. Mr. Brown has occupied the position of city engineer for 37 years and Mr. Talbot has rendered 25 years' service.

Mr. George Sutton, managing director of W. T. Henley's Telegraph Works Company, Ltd., who has been connected with the company for upwards of thirty-six years, has been elected chairman as from January 1, 1918, Mr. Sydney Gedge, owing to advancing age, having decided to relinquish that position. Mr. Gedge has been a director of the company for thirty-seven years and chairman for thirty years, and he will continue a member of the board.

Mr. E. E. Redhead, of the general manager's office of Wallasey Corporation tramways, having accepted a more remunerative position in a commercial house in Liverpool, was, on November 30, presented with a gold albert by the general manager, the members of the office staff, and other officials. Col. Greene spoke in high praise of Mr. Redhead's services, expressing regret at his departure, and best wishes for a successful career. The gift was a slight memento of Mr. Redhead's fifteen and a half years' service.

CONTRACTS AND ORDERS.

Derby Town Council have placed an order with Edison Accumulators, Ltd., for an electric chassis at £1,023.

Messrs. P. Fletcher and Company have an order from Derby Town Council for a coal elevator at £880 for the electricity works.

Sunderland Town Council has accepted the tender of the British Insulated and Helsby Cables for the supply of E.H.T. box compounds.

FINANCIAL REPORTS AND MEETINGS.

The Provincial Tramways Co., Ltd., announce a final dividend of 10 per cent. and a bonus of 6 per cent. per share on the ordinary shares, making, with the interim dividend, a total distribution of 10 per cent. for the year.

New Pegamoid, Ltd.—The report for the year shows that the net profits amounted to £5,000, and with the balance brought forward there is a total balance for disposal of £7,424. A dividend at the rate of 10 per cent. for the year absorbs £3,077, and £2,000 is placed to reserve, leaving £2,347 to be carried forward.

Six Months' Receipts in Glasgow.—During the first half of the financial year of Glasgow tramways which ended on November 30, the receipts, including those of Saturday, December 1, amounted to £699,017, showing an increase over the corresponding period of the previous year of £80,172. The number of passengers was 212,961,987, an increase of 26,562,275.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended December 5 amounted to £55,797, an increase of £11,232, as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to December 5 (thirty-five and a half weeks) the total receipts were £1,980,363, an increase of £258,346, on the corresponding period of 1916.

John I. Thornycroft and Company.—In a notice calling the annual meeting of the company for December 11, the directors express their regret that it has not been possible to prepare the accounts of the company up to July 31, 1916. Until the figures up to that date have been settled, the accounts for the following financial year have also to be held in abeyance. Consequently the directors summon a general meeting and ask for an adjournment to a date to be fixed hereafter. The company's liabilities under the Munitions of War and Excess Profits Acts involve such considerable amounts that it is impossible to estimate the result without risk of misleading the shareholders. Negotiations have been carried on continuously with the assessing authorities, and the failure to reach a settlement the directors state cannot be attributed to any unwillingness on the company's part to supply information or to accept any reasonable arrangement. The whole of the resources of the company continue to be employed on war work, and the high standard of work put into the company's products has given most satisfactory results under war conditions. The turnover of the business for the year ended July 31, 1916, was more than four times the pre-war average, and it has further increased in the past year. The old premises of the company at Chiswick have been satisfactorily sold, and the proceeds expended on the purchase of the freehold of the Southampton works. Large extensions of buildings and plant have been made without any financial assistance from the Government. The directors feel satisfied that the profits, after the deduction of debenture interest and interim dividends, will admit of the payment of final dividends of 3 per cent. on the preference shares and 10 per cent. on the ordinary shares, leaving a sufficient balance for transfer to the reserve account.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended November 24 give total receipts of £195,727 or £3,804 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £96 9s. 4d. per mile of single track, and last year at the rate of £77 16s. 8d., thus showing an increase for the week of £18 12s. 8d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	70	71
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	56/3	58/9
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	47/6	58/–
4%	4%	Do. 4% Deb.	100	91	70⅛	70/–
4½%	4½%	Do. 4½% Deb.	100	98½	70	69⅜
5%	5%	Do. 5% Deb.	100	96	66½	69⅜
—	—	Associated Omnibus Co., Ord. ..	5/–	3/32	1/3	1/3
7d.	1/–	Auckland Elec. Trams. Ord. ..	1	1 3/32	20/3	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102⅝	90	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	101½	105
—	1/–	Bath Electric Trams Pref. Ord.	1	⅛	4/–	4/–
6d.	6d.	Do. 5% Cum. Pref. ..	1	7/16	11/–	10/6
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	71½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/–*	20/–*	Bombay Elec. Sup. & Tram Ord.	10	14	20¼	20¼
6/–	6/–	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9¼	9¼
4½%	4½%	Do. 4½% Deb. ..	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	46	45
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90	92
4/–	4/–	Brisbane Elec Trams. Ord. ..	5	7½	£6/15/9	£6/15/9
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	80/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	29½	29½
6%	5%	Do. Pref. Ord.	100	106	29½	29
5%	5%	Do. 5% Cum. Pref. ..	100	103	42¾	42½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	82⅝	82⅝
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	57¾	57¾
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	32½	34½
6%	6%	Do. 6% Cum. Part. Pref.	100	—	75½	74½
5%	5%	Do. 5% Deb.	100	92	77¼	75
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65⅝	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	73	73
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	6⅞	7
2/6	2/6	Do. 5% Cum. Pref. ..	5	5 1/16	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74	74
1/–*	1/–*	Cape Elec. Trams.	1	1/16	12/3	11/5
1/3	1/3	City of B. A. Trams	5	5½	82/6	82/6
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82	81½
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
3/–	4/–	Dublin United Trams. Ord. ..	10	8	7½	7½
6/–	6/–	Do. 6% Pref.	10	12	10 7/16	10 13/16
—	—	Hastings & Dis. Elec. Tram Ord.	10/–	1/16	–/9	–/9
1/2⅜*	1/2⅜*	Do. 6% Cum. Pref. ..	1	7/16	9/3	9/3
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5d.	Hong Kong Tramway	5/–	5/16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	80¼	80½
2/6	3/–	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44⅜	44⅜
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	3/32	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9 11/16	9 11/16
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	71
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79⅛	79⅛
9⅜d.*	9⅜d.*	Llandudno & Colwyn B. Ord.	1	—	10/–	10/–
—	1½d.	London & Sub. Traction Ord. ..	1	13/64	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	7/16	7/–	7/–
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81⅜	81⅜
5%	5%	Do. 5% Inc. Deb.	100	88½	80	78
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	36	36
3/–	3/–	Madras Elec. 6% Pref. ..	5	5 1/16	85/–	85/–
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9⅜d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	71	69
$1¼	$1¼	Manila Elec. R. R. & Light ..	$100	102	72	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1¼	$1¼	Mexico Trams. Common ..	$100	70	32	32½
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	45	45
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	89	88½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2⅜*	2/–	National Steam Car	1	3/32	19/9	19/9
9⅜d.*	9⅜d.*	New General Traction	1	⅛	7/3	7/3
8⅜d.	6d.	Northern Gen. Trans. Ord. ..	1	3/32	12/9¾	12/9¾
6/–*	3/–	Para Elec. Rlys. Ord.	5	4½	78/9	81/3
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	6/6	6/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/3	12/–
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8⅜d.*	Potteries Elec. Trac. Ord. ..	1	3/32	6/4½	6/4½
6d.	6d.	Do. 5% Pref.	1	3/32	11/4½	11/4½
1/4	8d.	Provincial Trams. Ord. ..	1	¼	19/9	19/9
3/–	3/–	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd, '35 ..	—	97½	87¼	87¼
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	76	76½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	89	89
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74	74¾
12/–	10/–	Shanghai Elec. Cons.	10	13	14⅜	14⅜
3d.	3d.	Singapore Elec. Trams. ..	5/–	¼	4/7	4/7
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100⅛	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	94¾	94¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77⅜	77⅜
2/–	2/–	Un'd. El. Tr. Monte Video Ord.	5	4½	50/–	50/–
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	66
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅜	18/3	18/3
3/–	3/–	Do. 6% Cum. Pref. ..	5	⅜	84/7½	84/7½
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	15⅜	15½
—	—	Undgd. Elec. Rys. of London ..	10	21½	32/6	33/1½
		Do. "A"	1/–	¾	5/6	5/6
4½%	4%	Do. 4½% Bds. of 1933 Rd.	—	99	103½	102½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102½	103
4%	4%	Do. 6% In. Bonds Rd. ..	—	88⅛	81⅜	81⅜

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	Latest Return. 1917	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1917	Aggregate. Incr. or Dec.
Aberdare U.D.C. ..	Nov. 27	397	454	+ 57	34	15,218	+ 1,382
Aberdeen Corporation ..	„ 28	1,782	2,006	+ 224	26	56,532	+ 6,274
Ayr Corporation ..	Dec. 1	262	340	+ 77	29	14,808	+ 1,568
Belfast City	Nov. 30	5,693	7,083	+ 1,390	35	225,728	+ 26,054
Birkenhead Corporation	Dec. 2	1,521	1,864	+ 343	35½	64,797	+ 9,871
Birmingham Corporation	Nov. 24	12,618	19,550	+ 6,932	34	624,841	+ 74,315
do. Motor Omnibuses ..	„ 24	1,069	1,215	+ 146	34	35,724	+ 1,177
Blackburn Corporation ..	„ 28	1,061	1,323	+ 262	35⅔	53,257	+ 8,240
Blackpool & Fleetwood ..	„ 17	297	379	+ 82	43	41,623	+ 497
Bournemouth Corporation	Dec. 5	1,781	2,233	+ 452	35⅘	92,958	+ 8,030
Bradford Corporation ..	„ 1	6,445	7,242	+ 797	35	271,560	+ 29,249
Bristol	Nov. 30	4,572	5,438	+ 866	48	260,824	+ 25,205
Burnley Corporation ..	Dec. 1	1,604	1,808	+ 204	..	..	..
Burton-on-Trent Cor. ..	„ 2	250	331	+ 81	35	10,955	+ 1,115
Bury Corporation ..	„ 2	1,242	1,504	+ 262	35⅛	58,785	+ 7,431
Chatham & District ..	Nov. 29	1,172	1,121	— 51	48	61,247	+ 2,013
Cork Electric	„ 29	474	545	+ 71	48	26,463	+ 1,897
Derby Corporation ..	„ 24	1,008	1,258	+ 249	34	41,523	+ 2,137
Dublin United	„ 30	6,052	6,837	+ 785	48	322,772	+ 31,033
Dundee City	„ 28	1,317	1,526	+ 209	28½	43,896	+ 4,175
East Ham Corporation ..	Dec. 1	1,167	1,248	+ 81	35	49,130	+ 2,980
Exeter Corporation ..	Nov. 30	390	371	— 19	35	14,343	— 107
Glasgow Corporation ..	Dec. 1	23,347	27,033	+ 3,686	26⅔	699,017	+ 80,479
Glossop (U.E. Sup. Co.) ..	„ 1	134	165	+ 31	48	7,436	+ 757
Halifax Corporation ..	Nov. 27	1,872	2,164	+ 292	34⅔	86,610	+ 7,692
do. Motor Buses ..	„ 27	47	50	+ 3	34⅔	1,696	— 47
Hastings and District ..	Dec. 2	851	1,014	+ 163	48	59,771	+ 9,662
Huddersfield Corporation ..	„ 1	2,595	3,118	+ 523	35	113,022	+ 12,062
Ilford U.D. Council ..	„ 1	601	730	+ 129	35	26,989	+ 2,870
Ipswich Corporation ..	„ 1	393	549	+ 156	35	24,289	+ 5,676
Isle of Thanet ..	„ 1	236	143	— 93	9	1,466	— 1,039
Kilmarnock Corporation ..	„ 1	176	211	+ 35	28⅓	5,713	+ 602
Lanarkshire	Nov. 29	2,186	2,808	+ 622	48	133,117	+ 21,929
Lancashire United ..	„ 28	1,730	2,383	+ 653	48	112,942	+ 25,215
Leeds City	Dec. 1	9,331	11,020	+ 1,689	35	388,573	+ 41,544
Leicester Corporation ..	„ 3	3,301	4,029	+ 728	..	..	..
Leith Corporation ..	„ 1	830	1,059	+ 229	28⅔	31,025	+ 5,601
Leyton U.D. Council ..	Nov. 29	1,445	1,813	+ 368	35	66,321	+ 7,573
Liverpool Corporation ..	Dec. 1	13,963	16,447	+ 2,484	47⅔	747,918	+ 71,056
Llandudno & Colwyn Bay	Nov. 23	199	235	+ 36	51½	17,833	— 773
London County Council	Dec. 5	44,565	55,797	+11,232	35	1,980,263	+ 258,345
Maidstone Corporation ..	Nov. 29	185	225	+ 40	35	8,636	+ 840
Manchester Corporation	Dec. 1	17,998	21,044	+ 3,046	35	726,882	+ 62,288
Nelson Corporation ..	„ 1	210	237	+ 27	35	8,289	+ 707
Newcastle-on-Tyne Cor.	„ 1	6,742	8,202	+ 1,460	35	276,274	+ 40,191
New St. Helens & Dist. ..	Nov. 28	965	1,205	+ 240	22	32,349	+ 7,780
Northampton Cor. ..	„ 30	710	844	+ 134	35	29,480	+ 4,174
Nottingham Corporation	„ 29	3,778	4,605	+ 827	35	155,138	+ 16,556
Oldham Corporation ..	Dec. 2	2,192	2,752	+ 560	36	102,505	+ 12,631
Portsmouth Corporation	„ 1	2,149	2,504	+ 355	..	..	..
Provincial	„ 1	1,892	2,282	+ 390	8⅔	20,630	+ 2,347
Reading Corporation ..	Nov. 26	848	1,056	+ 208	35	37,086	+ 6,797
Rhondda Tramways ..	„ 22	1,194	1,576	+ 382	47	70,698	+ 10,214
Rotherham Corporation	Dec. 5	1,495	1,829	+ 334	35½	64,531	+ 8,758
Salford Corporation ..	„ 3	5,126	6,583	+ 1,457	35⅔	234,969	+ 39,525
Sheffield Corporation ..	„ 2	10,496	12,658	+ 2,162	36	433,887	+ 52,480
Southampton Cor. ..	Nov. 28	1,573	2,090	+ 517	34⅔	71,568	+ 12,440
Southend-on-Sea Cor. ..	„ 28	644	629	— 15	35	33,208	— 1,038
South Shields Cor. ..	„ 24	805	953	+ 148	34	32,597	+ 3,672
Sunderland Corporation ..	Dec. 2	1,565	1,877	+ 312	35	64,288	+ 5,803
Sunderland District ..	Nov. 21	646	801	+ 155	4	2,351	+ 414
Swindon Corporation	„ 28	200	257	+ 57	34⅓	9,475	+ 2,265
Torquay Tramways	„ 22	431	650	+ 219	47	31,409	+ 3,264
Tyneside Trys. & Trmrds.	„ 21	525	811	+ 286	21	18,921	+ 4,749
Wallasey Corporation .	Dec. 1	1 166	1,404	+ 238	35½	56,356	+ 6,295
Walsall Corporation ..	„ 1	776	1,029	+ 253	35	34,567	+ 4,998
Walthamstow U.D. Coun	„ 1	926	1,143	+ 217	35	43,797	+ 4,686
Warrington Corporation	Nov. 22	491	674	+ 183	34	18,806	+ 1,861
West Ham Corporation	„ 29	2,912	3,633	+ 721	34⅔	128,148	+ 14,591
Wigan Corporation ..	„ 29	1,700	2,143	+ 443	35	70,047	+ 10,516
Yorkshire (West Riding)	Dec. 2	1,768	2,387	+ 619	48	102,463	+ 17,981

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War :—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., Hull, London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	Latest Return. 1917	Aggregate. Wks.	Aggregate. 1917	Increase or Dec.
Anglo-Argentine	Dec. 2	£52,450	£54,091	48	£2,492,924	+ £38,493
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo (4 wks)	Oct. 7	3,390	3,560	28	22,113	+ 3
Brazilian Traction (Mlrs.)	Sept.	7,138,000	7,925,000	39	68,430,000	+ 5,279,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Oct.	445,263	491,964	17	1,842,476	+ 146,817
Buenos Aires Lacroze ..	Nov.	39,679	39,133	21	189,575	— 1,214
Burmah Tram. & Light Rs.	Oct.	29,768	28,955	13	81,837	+ 3,907
Calcutta .. .. Rs.	Dec. 1	72,116	71,598	48	3,266,975	+ 94
Cape Town	Oct.	14,238	17,128	..	..	..
Carthagena and Herrerias	Nov.	2,252	3,932	47	45,142	+ 17,751
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
East India	Nov.	1,942	871	17	5,174	— 3,895
Hong Kong .. .. $	Sept. 22	13,970	14,080	38	513,646	— 41,551
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Oct.	4,434	4,069	43	40,615	— 1,441
Lima	Oct.	33,303	37,537	43	359,732	+ 22,341
Lisbon .. .. Escu	Sept.	194,276	228,097	..	..	..
Madras .. (2 weeks) Rs.	Nov. 30	29,664	33,914	47	765,562	+ 70,392
Manila .. .. $	June	59,432	73,000	..	..	..
Manaos .. .. Rs.	Sept.	141,286	157,761	..	..	..
Montevideo	Oct.	28,729	30,153	52	359,832	+ 12,060
Pernambuco	Nov. 25	3,400	4,333	46	180,428	+ 35,981
Peruvian .. .. $	Nov.	925,820	1,034,790	21	4,987,180	+ 472,530
Port Elizabeth	Oct.	3,131	3,885	..	..	..
Rangoon	Nov.	5,033	5,358	47	55,379	+ 1,975
Shanghai .. .. $	Oct. 3	24,053	28,458	..	..	..
Singapore .. .. $	Oct. 20	12,463	12,669	42	543,019	+ 12,809
Toronto .. .. $	Oct.	907,460	1,043,886	43	9,934,998	+ 1,021,774
Winnipeg .. .. $	Oct.	278,817	301,722	43	2,733,516	— 6,755

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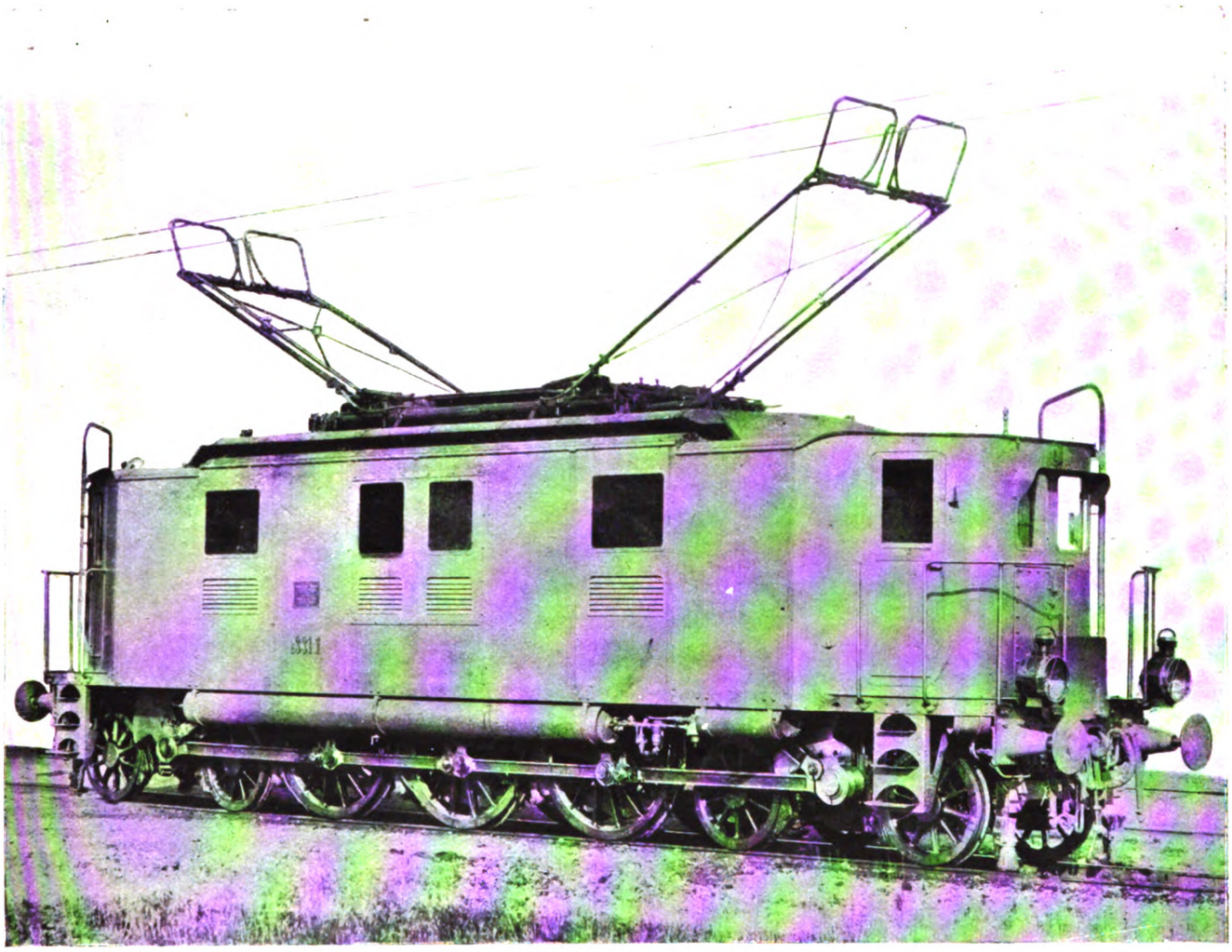
THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, DECEMBER 13, 1917. VOL. XLII.

ELECTRIC LOCOMOTIVE FOR ITALIAN STATE RAILWAYS.

The Italian State Railways have in service the first of a new series of three-phase electric locomotives ordered from the Brown Boveri Company, of Italy, for use more especially in high-speed services on fairly level routes where the curves are sharp and frequent. to the *Rivista Tecnica* of the Italian State Railway service, which has published a useful account of the locomotives, prepared by Sign. P. Verole and B. Marsili, of the State Railways department.

The general working conditions and the essential



Three-Phase Electric Locomotive—2-C-2 Type—Italian State Railways.

Locomotives of somewhat similar type were referred to in our issue of August 10, 1916, and some of the details of designs were then given. We now take the opportunity of publishing a more complete description with drawings and photographs, in order to show the novel features of a more recent type especially designed for these particular conditions. For this information and the illustrations we are largely indebted features of the new locomotives correspond so far as regards the tractive force, speeds, and efficiency with those obtained with the polyphase locomotives previously built for the State Railways by the Italian Westinghouse Company and described in our issue above mentioned, under the heading of type 1-C-1; the type now introduced is known as 2-C-2. Italian engineers, it should be noticed, describe locomotives

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by the axles and not the wheels; in English parlance, these would be respectively of the 2-6-2 and the 4-6-4 class.

Like the other powerful electric locomotives already at work on the Italian railways, these new ones are provided with four running speeds, though obviously they could be much simplified by employing two speeds only. The difficulties of working with two speeds are, however, greater than the advantages of locomotive simplification. If the maximum speed is to be not less than 100 kilometers per hour (62 miles) whatever may be chosen for the lower speed, it would not be possible on existing lines, or those to be electrified, to satisfy the requirements of train circulation. An intermediate and also a low speed will both be necessary if time is not to be lost on certain parts of the line.

Moreover, for coupling up two locomotives to a heavy train, a multiple control can only be secured by the locomotives being of similar speed design; and for starting, it is clear that excessive waste of current must occur in resistances unless a comparatively low starting speed is provided. Hence the four running speeds of the new design give a much wider range of economical working although at the cost of some complications in the electrical and mechanical arrangements of the locomotive.

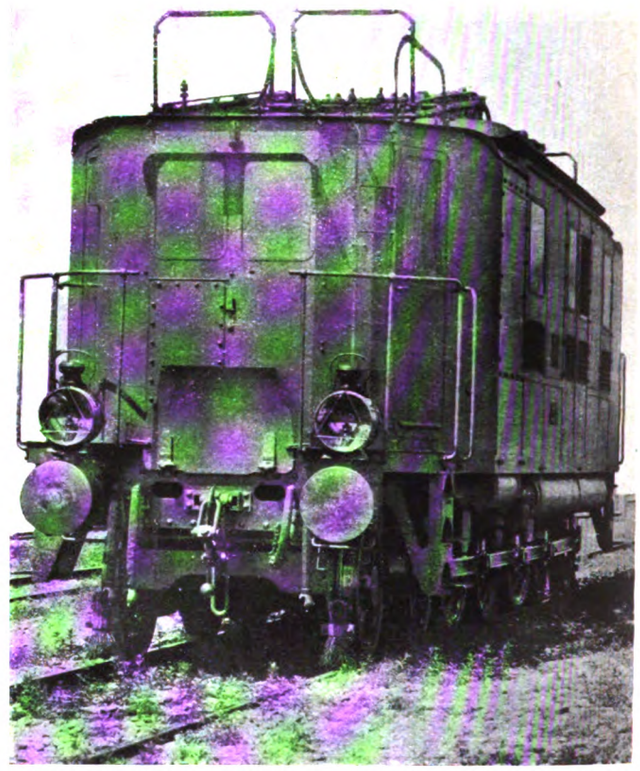
The main features of the locomotive are shown in the following summary:—

Line contact pressure, 3,000 to 3,700 volts, alternating.
Frequency, 15 to 17 periods.
Number of motors, 2.
Total weight, 92 tons; adhesion weight, 49·5 tons.
Coupled driving axles, 3.
Running axles, 4, on two swivelling bogie trucks, front and rear.
Diameter of driving wheels, 5 ft. 3¼ in.
Diameter of running wheels, 3 ft. 1½ in.
Running speeds (motors in synchronism) at frequency of 16·7 periods, allowing for half wear of tires:—
100, 75, 50, and 37·5 kilometres per hour.
Equal to 62, 46, 31, and 23 miles per hour.
Tractive force at driving wheel periphery, continuously for one hour, frequency 16·7 periods, line pressure 3,300 volts, respectively in tons:—
Miles per hour, 62, 46, 31, 23.
Tons ... ... 6, 9·5, 9, 9.
Tractive force at driving wheel periphery, with adhesion co-efficient of quarter maximum obtained on sanded track, at starting, about 12 tons.
Efficiency and power factor of driving motors, with normal loads and at speeds of 62 and 46 miles per hour, respectively, 0·935 and 0·85.

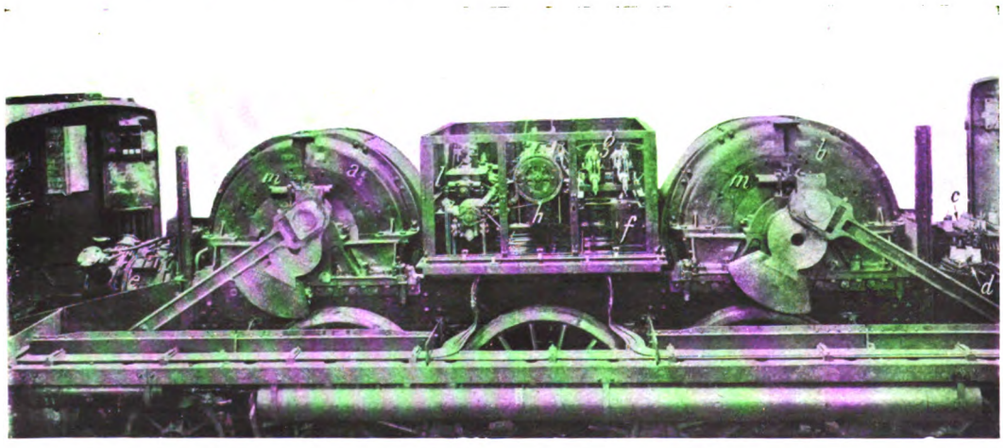
Four-wheeled bogie trucks are provided at each end instead of the two-wheeled radial axles of the 1-C-1 type, in order to give greater ease of running on short radius curves at high speeds. This method does not, however, allow so much useful weight for adhesion purposes, the comparative figures being thus stated:—

	Total weight.	*Available for adhesion.*
1-C-1	73 tons	51 tons
2-C-2	92 ,,	49·5 ,,

With a two-wheeled axle at each end, the 2-C-2 type should presumably have about 64·3 tons available for adhesion; but so long as the loads are not excessive, and this is not to be expected in high speed services, the advantages of easy travel round curves is preferred to surplus adhesion weight. In any case the tractive efforts are the same for the different speeds.



Front End View of Three-Phase Electric Locomotive.



a, *b*.—Traction motors.
c.—Transformers.
d.—Transformer switch.
e.—Air compressors.
f.—Insulated box for discharger.
g.—Knife switches.
h.—Resistance regulator.
l.—Locomotive reversing switch.
m.—Compressed air cylinders controlling rotor pole changer.

Side View of Three-Phase Electric Locomotive, showing Traction Motors and Insulated Box Compartment for High Tension Gear.

The six coupled driving wheels have, of course, no lateral play, but the rigid wheel base is comparatively short — 11 ft. 9¾ in. with driving wheel centres half of this, or 5 ft. 10 in.; total length over all, including buffers, 44 ft. 6 in. The system of driving embodied in the mechanism between motor axles and driving wheels is the same as that already used in the 1-C-1 type where connecting rods from the motor axle crank discs are coupled to similar crank discs on secondary axles mounted

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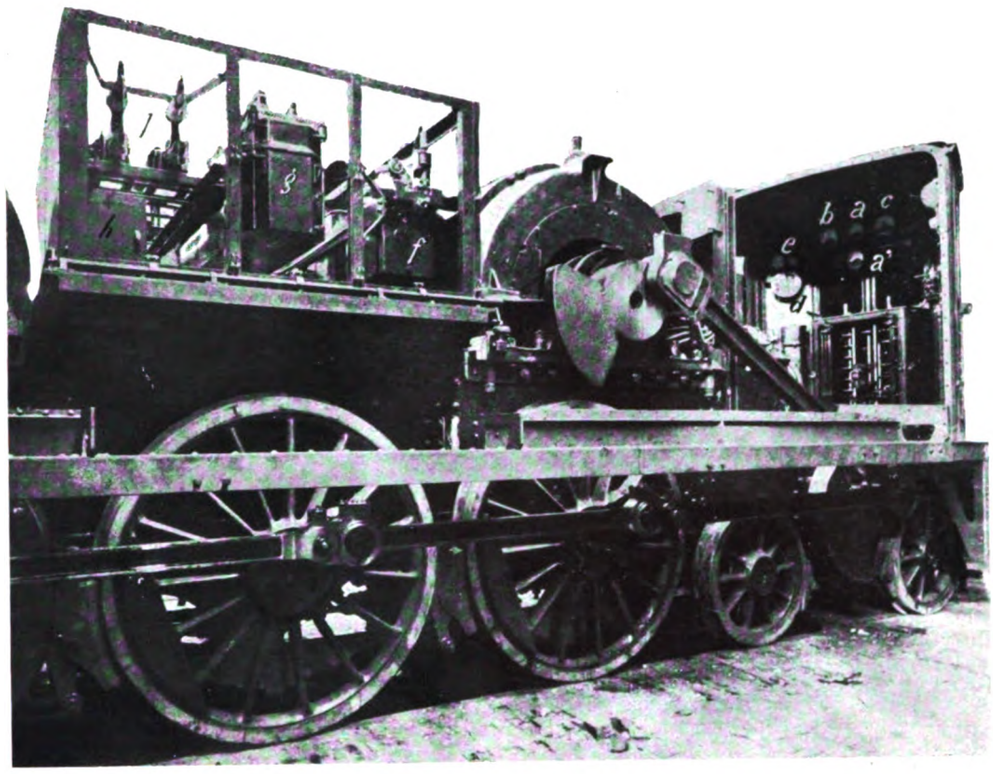
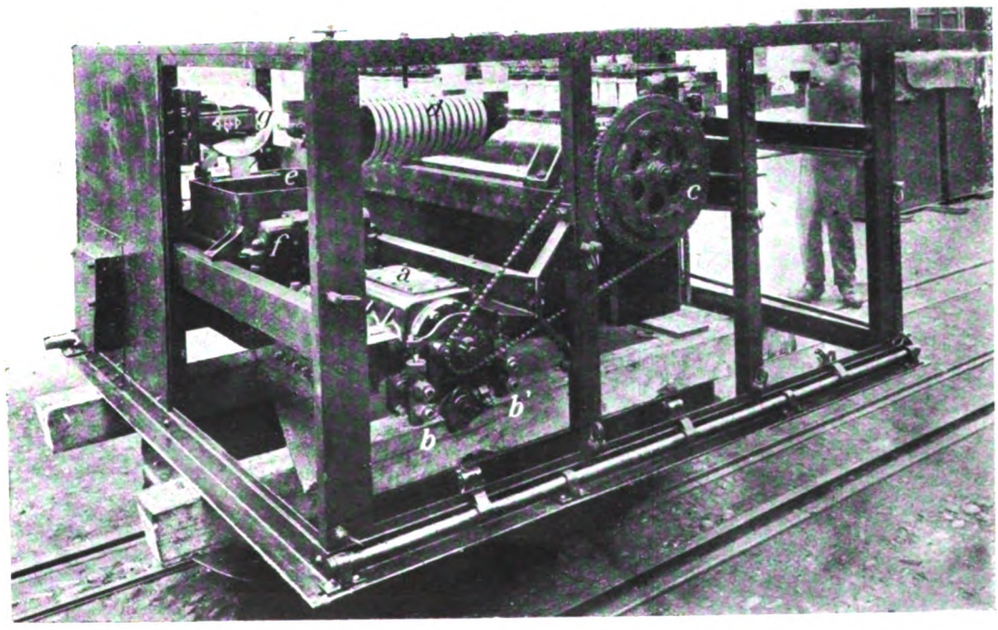


a, a_1.—Ammeters.
b.—Voltmeter.
c.—Wattmeter.
d.—Speed indicator.
e.—Pressure gauges.
f.—Automatic cut-out for traction motors.
g.—Resistance regulator.
h.—Insulated box for discharger.
l.—Knife switches

Side View of Three-Phase Electric Locomotive, showing Connecting Rod Driving Gear.



a.—Three-cylinder compressed air motor controlling resistance regulator.
b, *b*.—Air valves adjusting resistance regulator control with control lever on main controller.
c.—Resistance regulator.
d.—Impedance coils.
e.—Locomotive reversing switch.
f.—Compressed air cylinders controlling *e*.
g.—Transformers.

Insulated Box Compartment for High-Tension Gear.

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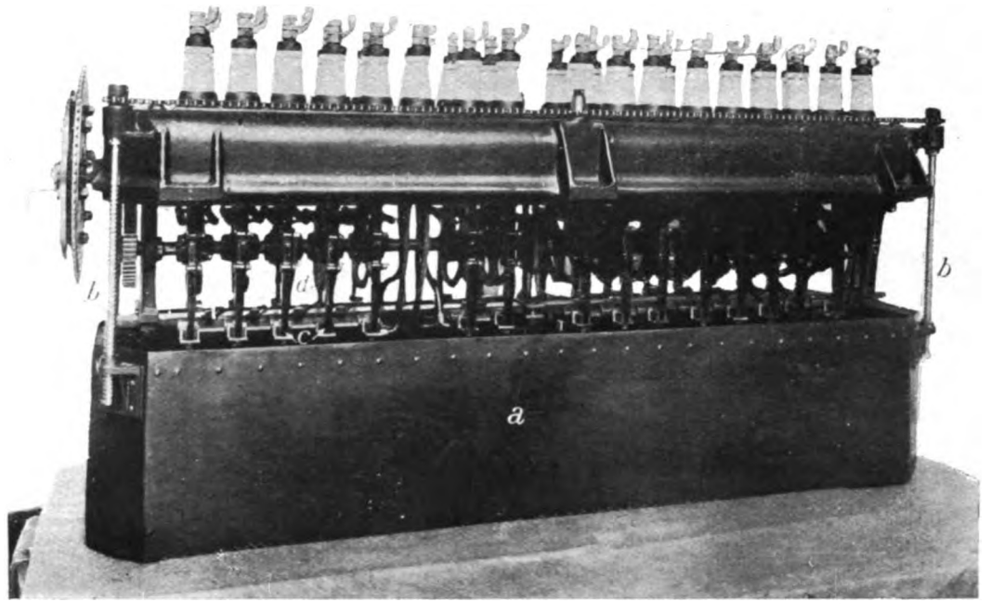
in the locomotive framing, and also provided with side rods connecting up all the driving wheels on each side. The working angle for the connecting rods, which on the smaller locomotives could not be reduced below 60 deg., has now in these larger and longer types been brought down to about 33 deg., and this flattening of the driving rods' angle must considerably reduce any vertical forces acting through the auxiliary axles.

Automatic compressed air brakes are fitted, and can be applied to all the locomotive wheels, there being a separate cylinder for each bogie truck, and one for the six coupled driving wheels. The braking force on the coupled axles, with average air pressure of 50 lbs. per square inch, represents about 60 per cent. of the adhesion weight, that on the truck axles is a smaller amount—about 35 per cent. A hand brake worked from either end of the locomotive acts on the coupled wheels only. The electrical details of these new locomotives will, however, prove of most interest to our readers, and we therefore give them at greater length.

The four running speeds already referred to are, as usual, obtained by connecting the motors either in series or in parallel, and by corresponding variations in the number of poles, thus :—

						Miles per hour.
1.	Motors in series,	each with	8	working	poles ...	23
2.	,,	,,	6	,,	...	31
3.	,, parallel,	,,	8	,,	...	46
4.	,,	,,	6	,,	...	62

The two traction motors have their stator windings arranged star fashion when working in series with six poles, and also when in parallel either with six or eight poles, but when they are working in series with eight poles the stator winding of the secondary motor is thrown into a delta connection in order that the voltage in starting resistances shall not exceed about



a.—Oil case.
b, *b*.—Screws for raising and lowering cover
c.—Moving contacts.
d.—Cams operating *c*.

Resistance Regulator.

a.—Oil case. *b*, *b*.—Screws for raising cover. *c*.—Air cylinders. *d*.—Fixed contacts. *e*.—Cylinder with moving contacts.

Star and Delta Connecting Switch for Stator Winding of Secondary Motor.

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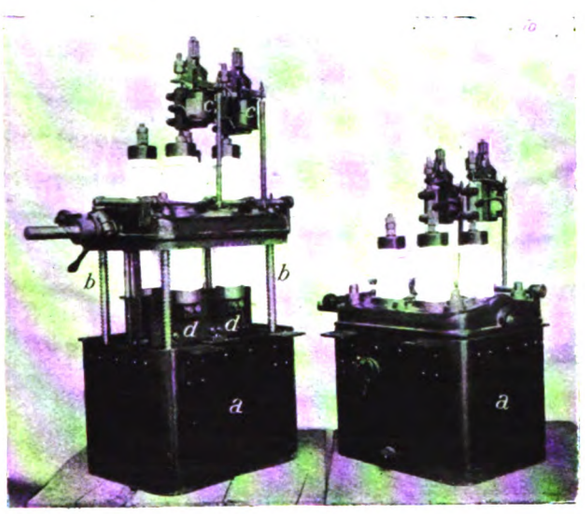
2,000 volts. By "secondary motor" is meant the following:—If we call the primary motor that which receives line current only in its stator, the secondary motor is that which is fed either by line current in its stator, or in its rotor by current from the rotor of the primary motor. That is, by way of divergence from the methods used in the 1-C-1 type of polyphase locomotive, when working in series the current-inducing member of the secondary motor rotates, while the member in which current is produced is fixed. Moreover, whereas in the 1-C-1 type the current led into the traction motors is either three phase or double phase, in the new type it is always three phase. The number of poles either in stator or rotor is as usual varied from six to eight by changing the coil connections through appropriate switch gear. There are therefore the following principal appliances used for electric control:—

1. Two commutator switches for varying the stator coil connections and consequently the number of poles.
2. Two commutator switches for similar action in regard to rotor coil connections.
3. Speed regulator, connecting the two traction motors in series or in parallel.
4. A commutator switch for joining up the secondary motor stator winding either in star or delta group.
5. Automatic circuit breaker for the traction motors.
6. Reversing switch for running backwards.
7. Metallic starting resistance, with regulator and special arrangement for throwing part of the resistance either into series or parallel.

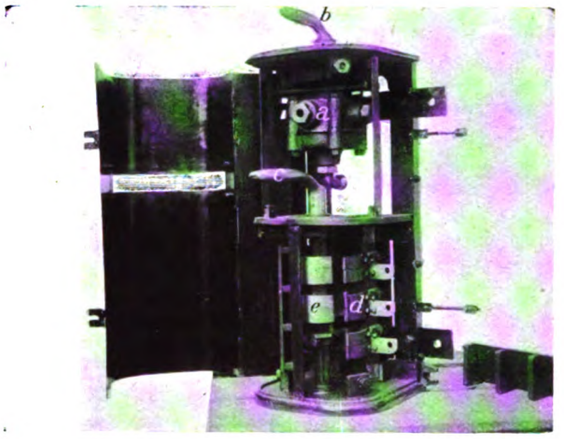


a.—Oil case.
b, *b*.—Screws for raising and lowering cover.
e.—Maximum current discharge coils.
d, *d*.—Fixed switch contacts.

Transformer Cut-out.

For the auxiliary mechanism of these locomotives there are provided in addition two 20-KW. three-phase transformers, which reduce the line current voltage in the ratio of 30 to 1. Through these transformers are fed two three-phase motor compressors, which give the compressed air used for braking and also for actuating the main electric gears connected with the traction motors. Two fans are installed for air cooling the traction motors and resistances; also four separate knife switches controlling the two sets of overhead collector bows at each end of the locomotive; two impedance coils, one for each of the two phases in the two overhead wires; and two roller contact lightning dischargers, one for each overhead wire or phase. These dischargers are arranged in special boxes of incombustible and insulating material. There are further two transformers, one for each phase of the overhead circuit, in the circuits of which are installed four ammeters, two in each locomotive cab; and two similar transformers for wattmeter circuits, one in each cab.

All the high-tension apparatus and appliances are placed in a compartment between the two traction

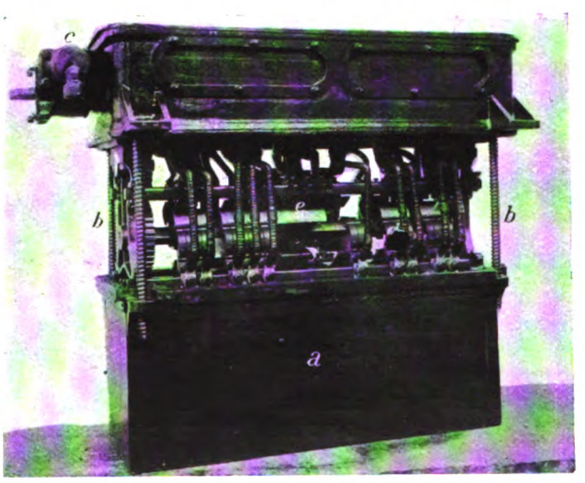


a.—Air valve for raising trolley bows.
b.—Portable key controlling valve *a*.
c.—Push-button for compressor switch.
d, *e*.—Fixed and moving contacts of switch.

Compressed Air Controller for Raising and Lowering Trolley Bows, also Switch for Air Compressors.

motors and in the centre of the locomotive (a driver's cab being provided at each end), and they are also locked by a lever key that serves to actuate the pneumatic lifter for the collector bows on the locomotive roof. The traction currents from the overhead collector bows pass first through the four main knife switches, then branch out through the lightning arresters and impedance coils into the automatic circuit breaker for the traction motors, thence to the primaries of the wattmeter transformers and the direction-reversing switch. Here the two currents from the overhead wires separate again, those of one phase passing to the running speed regulator and the windings of the primary traction motor, while those of the other phase go to the running speed regulator and the commutator switch for varying the poles of the primary traction motor.

The speed regulator, besides serving to put the traction motors either in series or parallel, has also the duty of connecting up to resistances at starting the



a.—Oil case.
b, *b*.—Screws for raising and lowering cover.
c.—Air cylinders.
d.—Fixed contacts.
e.—Cylinder with moving contacts.

Speed Regulator.

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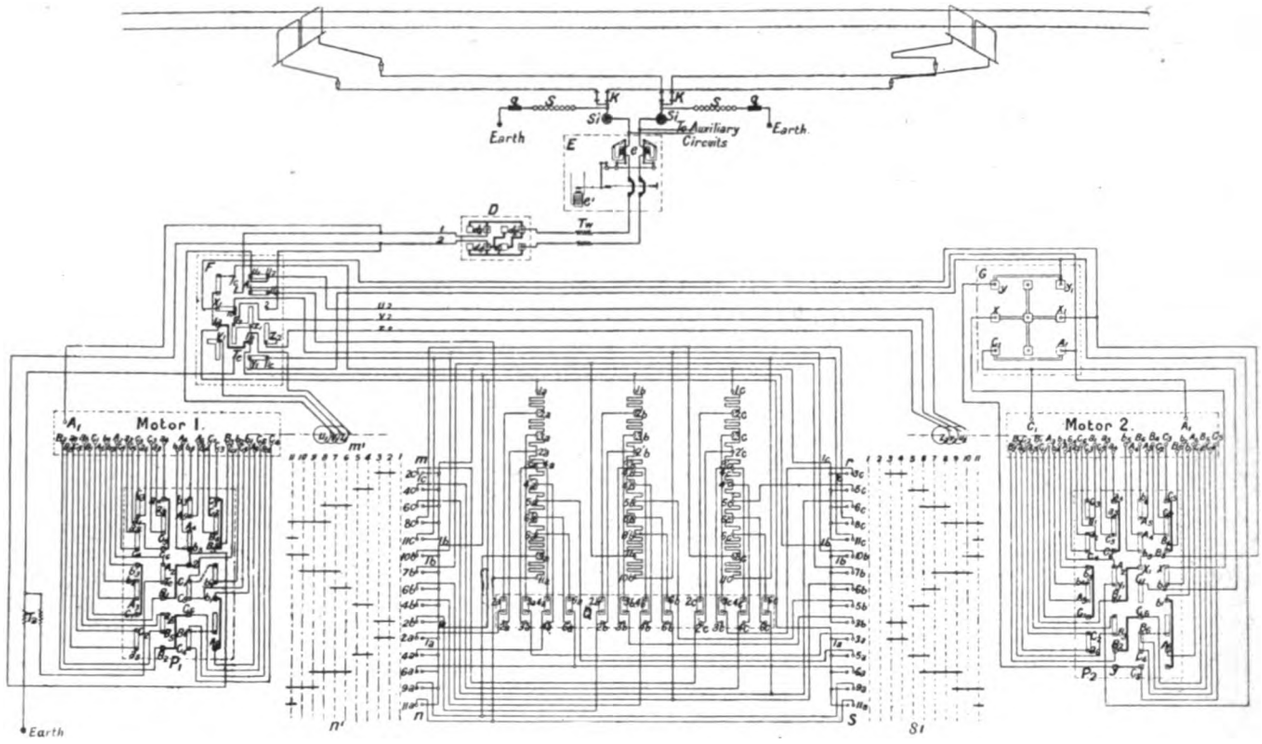
stator of the secondary motor, and both the rotors; it also provides electric connection between the rotor rings, the same resistances, and the stator of the secondary motor. These latter connections, however, are not made directly but by means of the stator pole switch, and of the commutating switch controlling the star and delta connections. It may be noted that no variation of resistance follows on the movement from zero point to first notch, the result of this operation being merely, in effect, to cause the closing of the main automatic circuit breaker, which is thus controlled by the resistance switch. The main circuit breaker acts on the overhead wire supply at two points on each phase, and is provided with two maximum current and one minimum current electro-magnets, the latter coming into play when pressure fails for any reason at which protect the circuits from excess current, and also serve to cut out of circuit the secondary winding of one or other of these auxiliary transformers. The three conductors above mentioned are led to a commutator switch that allows the auxiliary appliances to be fed either from their own transformers or from the depot circuits when the locomotive is in the depot. From the commutator switch pass three conductors forming a three-phase line along the locomotive from which are taken branches for the different auxiliary working mechanisms.

To warn the driver of any possible overload liable to cause the transformer automatic circuit breakers to come out, two signal glow lamps in the cabs at each end of the locomotive are kept alight by the transformer secondaries; in the separate circuit of each



A_1 to A_6, a_1 to a_6, B_1 to B_6, b_1 to b_6, C_1 to C_6, c_1 to c_6.—Free ends of stator windings—traction motors.
D.—Reversing gear for locomotive.
d_1, d_2, d_3, d_4.—Moving contacts of reversing gear.
E.—Automatic main switch for traction motors.
e.—Minimum voltage coil on main automatic switch.
F.—Speed regulator.
G.—Star and delta connection switch.
K, *K.*—Knife switches for overhead wire collector bows.
m, *n*, *r*, *s*.—Fixed contacts—resistance regulator.
m_1, n_1, r_1, s_1.—Moving barrel contact segments—resistance regulator.
P_1.—Stator pole commutator switch—primary traction motor.
P_2.—Stator pole commutator switch—secondary traction motor.
Q.—Resistance commutator switch.
q, *q.*—Carbon resistances in series with lightning dischargers.
S, *S.*—Roller contact lightning dischargers.
Si, *Si.*—Impedance coils.
Ta.—Primary winding of transformer for ammeter.
Tw.—Primary winding of transformer for wattmeter.
u_1, v_1, z_1.—Primary traction motor contact rings.
u_2, v_2, z_2.—Secondary traction motor contact rings.
vv_1, vv_2.—Extra fixed contacts for joining up the secondary traction motor with speed regulator *F* and with star delta switch *G*.
1*a* to 11*a*, 1*b* to 10*b*, 1*c* to 11*c*.—Starting resistances.

Wiring Connections for Traction Motor and Controller.

the locomotive collector bows. The reversing switch changes over the two overhead wire phases when it is required to reverse the direction of running of the locomotive.

The auxiliary mechanisms of the locomotive are operated from the overhead wire circuit through separate automatic cut-outs and the primaries of the two transformers, the third phase of the latter being from earth through the locomotive framework. Six cables are led from the six divisions of these transformer secondary windings and are joined up two by two to form three conductors, one for each phase. In the two phases of the secondaries are inserted fuse cut-outs lamp is inserted a small switch controlled by the respective circuit breaker, so that if the breaker opens the lamp goes out.

On emergency the main automatic circuit breaker protecting the traction motors may be operated independently of the main controller apparatus by a push button on each main controller frame in the locomotive cabs opening two small switches in the magnet circuit of the minimum current cut-out, so cutting the magnet winding circuit and operating the breaker. Two of the four main ammeters provided serve to show the volume of current passing through the primary motor from the overhead circuit; and the other two are used

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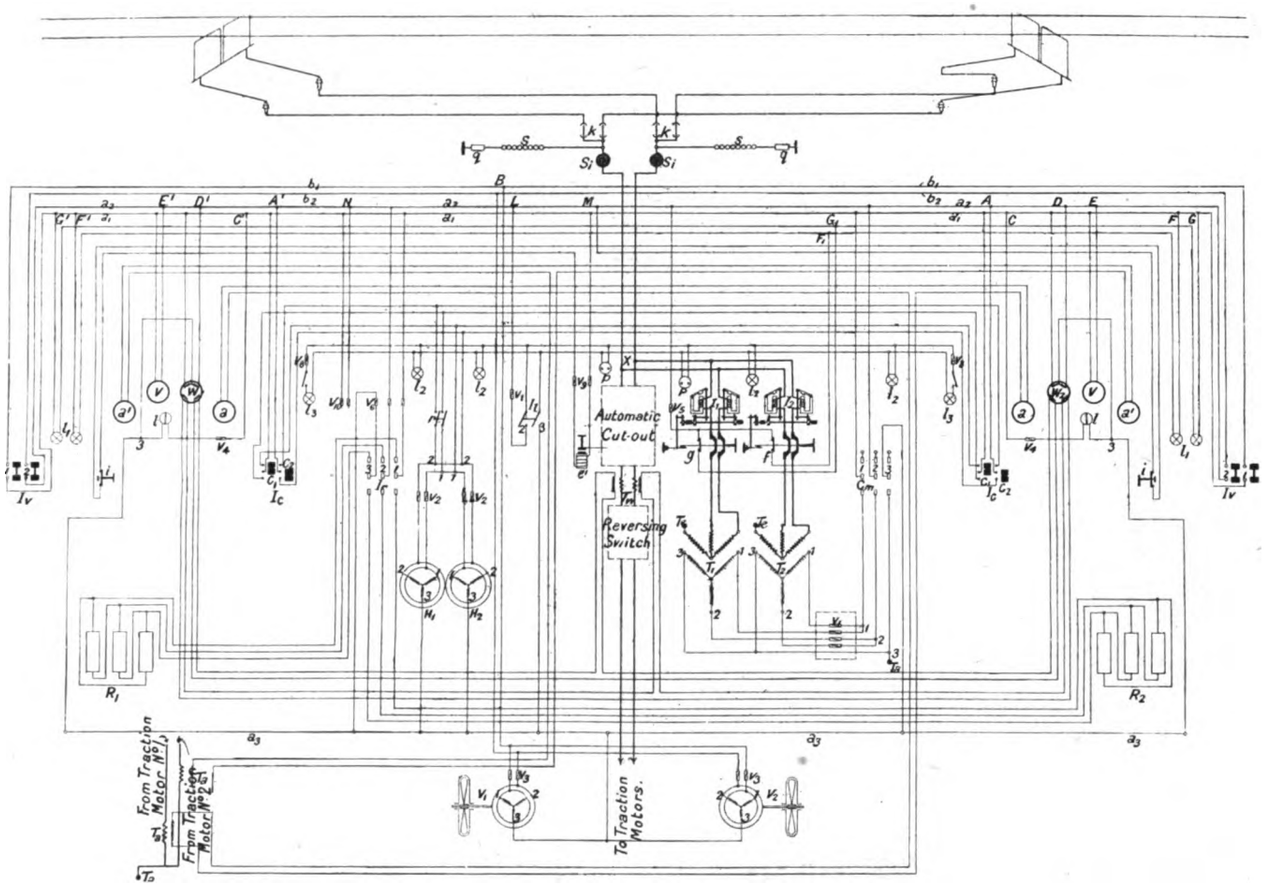
for the secondary motor current from the overhead lines, being cut out when the motors are arranged in series.

The main hand or driving control of the locomotive is of course in duplicate, for the two cabs, one at each end; and the principal controlling mechanisms are operated by compressed air through the main controllers. These have each three handles, the central one is for reversing the direction of running, and at the Besides these handles on the controller top plate, there is also, in the right-hand front corner, the push button switch already referred to as an emergency opener of the main circuit breaker.

In front of the driver, above the controller, are mounted the measuring instruments—voltmeter, wattmeter, and two ammeters—while on his right under the cab roof is placed a small switch and fuse board, carrying the two signal lamps from transformer switches,



a_1, a_2, a_3.—Three-phase low tension circuit.
a, a, a_1, a_1.—Ammeters in locomotive cabs.
A, A_1.—Branch leads feeding compressor motors.
b_1, b_2.—Branch leads feeding fan motors.
C, C.—Branch leads feeding lamp for measuring instruments.
Cm.—Change-over switch connecting auxiliary apparatus mains either to overhead line wires or to depot circuits.
D, D_1.—Connections to voltometric coils of wattmeter.
E, E_1.—Voltmeter connections.
F, F_1, F_1, G, G_1, G_1.—Connections for signal lamps l_1, to show opening of transformer automatic circuit breaker.
f, g.—Small switches to keep signal lamps automatically off or on according as transformer circuit breakers are open or shut.
H_1, H_2.—Motors for pneumatic compressors.
I_1, I_2.—Transformer automatic circuit breakers.
Ic, Ic.—Hand-operated switch for compressors, controlling pressure regulator in or out of action.
Il.—Two-phase switch for locomotive cab lighting.
Ir.—Electric heater switch.
Iv, Iv.—Fan motor switches.
K, K.—Knife switches for overhead wire circuits.
L.—Branch lead for locomotive fixed and portable electric light.
l, l.—Lamps for lighting measuring instruments.
l_1, l_1.—Signal lamps indicating off or on position of transformer automatic circuit breaker.
l_2, l_2, l_2, l_2.—Lamps for lighting central (high tension) compartment of locomotive.
l_3, l_3, l_3.—Locomotive cab lights.
M.—Branch lead to minimum tension coil of main automatic circuit breaker.
N.—Connection to interlocking circuit.
p, p.—Plug sockets for portable lamps.
q, q.—Carbon resistances in series with lightning dischargers.
R_1, R_2.—Electric heaters.
r.—Air pressure regulator.
S, S.—Lightning dischargers.
Si, Si.—Impedance coils.
T_1, T_2.—Three-phase transformers (1 to 30 ratio) for auxiliary apparatus circuits.
Ta, Ta.—Transformers for ammeters.
Tw.—Transformers for current coils of wattmeters.
V_1, V_2.—Traction motor and resistance coils ventilating fans.
v, v.—Voltmeters.
v_1 to v_{10}.—Fuse plugs.
X.—Branch leads from overhead line phases for feeding the transformers.
W, W.—Wattmeters.

Wiring Connections for Auxiliary Circuits.

same time switching off the ventilating fan motors; that on the driver's right for closing and opening the main automatic circuit breaker, also for working the resistance regulator; while the third, on the left, is used for the simultaneous control of the motor-pole commutator, of the speed regulator, and of the star or delta connection commutator switch. This third handle, therefore, controls the speed of the locomotive.

with switches and fuses for the fan motors, cab lights, measuring instruments, etc., etc. Below this board, on a level with the main controller, are the two Westinghouse brake cocks, for normal and emergency stops.

On the left of the main controller is the subsidiary controller with compressed air tap for lifting or lowering the four overhead collector bows, also an interlocking

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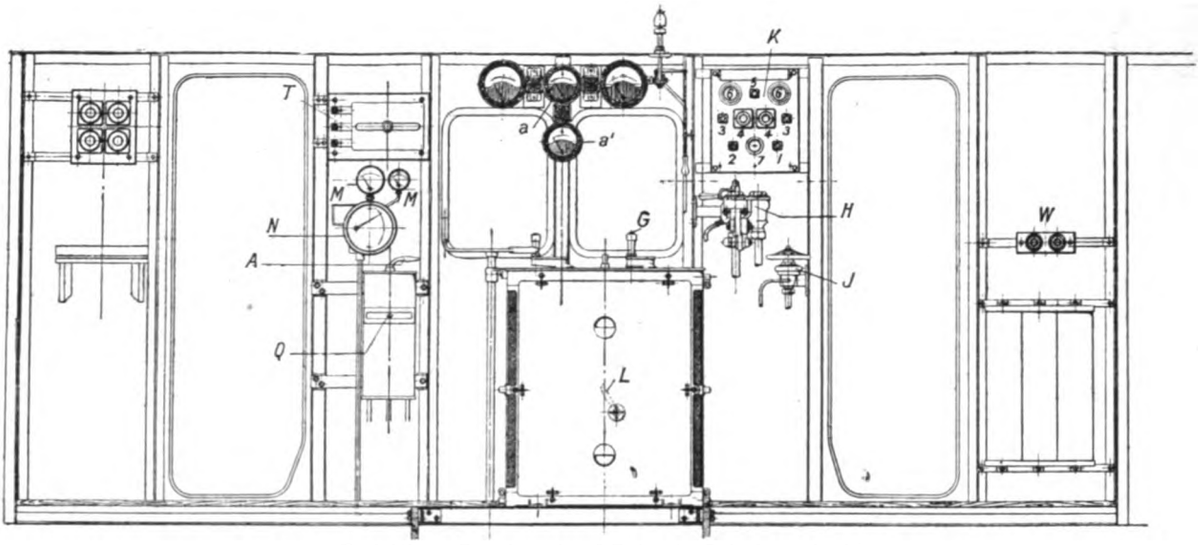
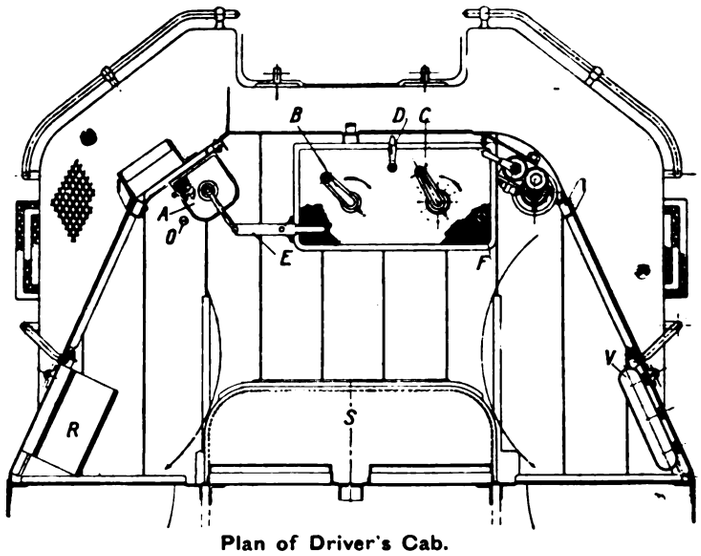
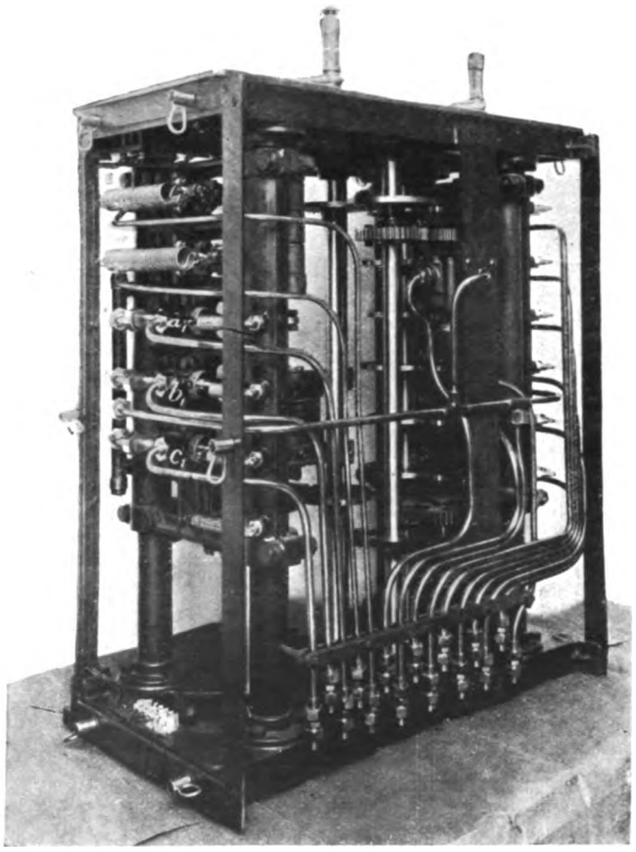


End View (Developed) of Driver's Cab from Inside.

A.—Controller operating collector bows.
a, a_1.—Ammeters for primary and secondary traction motors.
D.—Reversing gear handle; also control of ventilating fans.
B.—Controller lever for pole varying switch.
C.—Controller lever resistance regulator.
E.—Hand brake lever.
F.—Emergency push-button operating main automatic switch.
G.—Push-button for alarm whistle, fixed in handle of controller lever.
H.—Hand valve instantaneous application—Westinghouse brake.
J.—Hand valve, slow-acting Westinghouse brake.
K.—Switchboard. 1. Fuse for cab lights. 2. Fuse for instruments. 3. Fuse for interlocking circuit. 4. Fuse for ventilating fan. 5. Fuse for signal circuits. 6. Tell-tale lamp on auxiliary plant trans. switch. 7. Switch for cab lights.
L.—Collector bows controller lever in position to unlock main gear.
M.—Air pressure gauges. *N*. Speed indicator.
O.—Compressed air pipe.
Q.—Lever controlling two-pole switch for air compressor motors.
R.—Lift-up desk. *S*.—Tool-box.
T.—Three-pole throw-over switch connecting secondaries of auxiliary plant transformers either to overhead wire circuit or to depot circuit.
V.—Electric heater.
W.—Switches for current from trolley wires.



Plan of Driver's Cab.



Back View of Main Controller Frame.

a, *b*, *c*.—Air valves controlling compressed air supply to 3-cylinder motor operating resistance regulator.

switch that controls the air compressors. The compressed air lever has four positions :—

1. All bows raised.
2. Forward bows raised.
3. Rear bows raised.
4. All bows lowered.

The hand brake spindle and arm are attached to the left-hand side of the main controller, between it and the subsidiary controller just mentioned. On the front of the latter is also a short projecting handle working in a horizontal slot ; this operates the double-pole switch controlling the air compressor motor. A revolution speed indicator and two pressure gauges are installed above the subsidiary controller for use in connection with the compressor plant ; and on a switchboard above these instruments there are installed in the forward cab of the engine the necessary fuses and a three-pole commutator or throw-over switch for the secondaries of the auxiliary plant transformers, so that these can be fed by induced current from the overhead circuit, under running conditions, or from the depot circuits when the locomotive is in the sheds. The rear cab of the engine has a switchboard similar to that already described as fixed in the front cab, also a three-pole switch for electric heaters in each cab. Two plug switches at each end serve for flexible lamp connections to enable close inspection of all working parts.

Although "front" and "rear" cabs are here mentioned, it will, of course, be understood that in all practical respects they are similar ; the front cab is merely that from which the locomotive as a rule is driven, as obviously the design of auxiliary mechanism is much simplified if the locomotive can always (or

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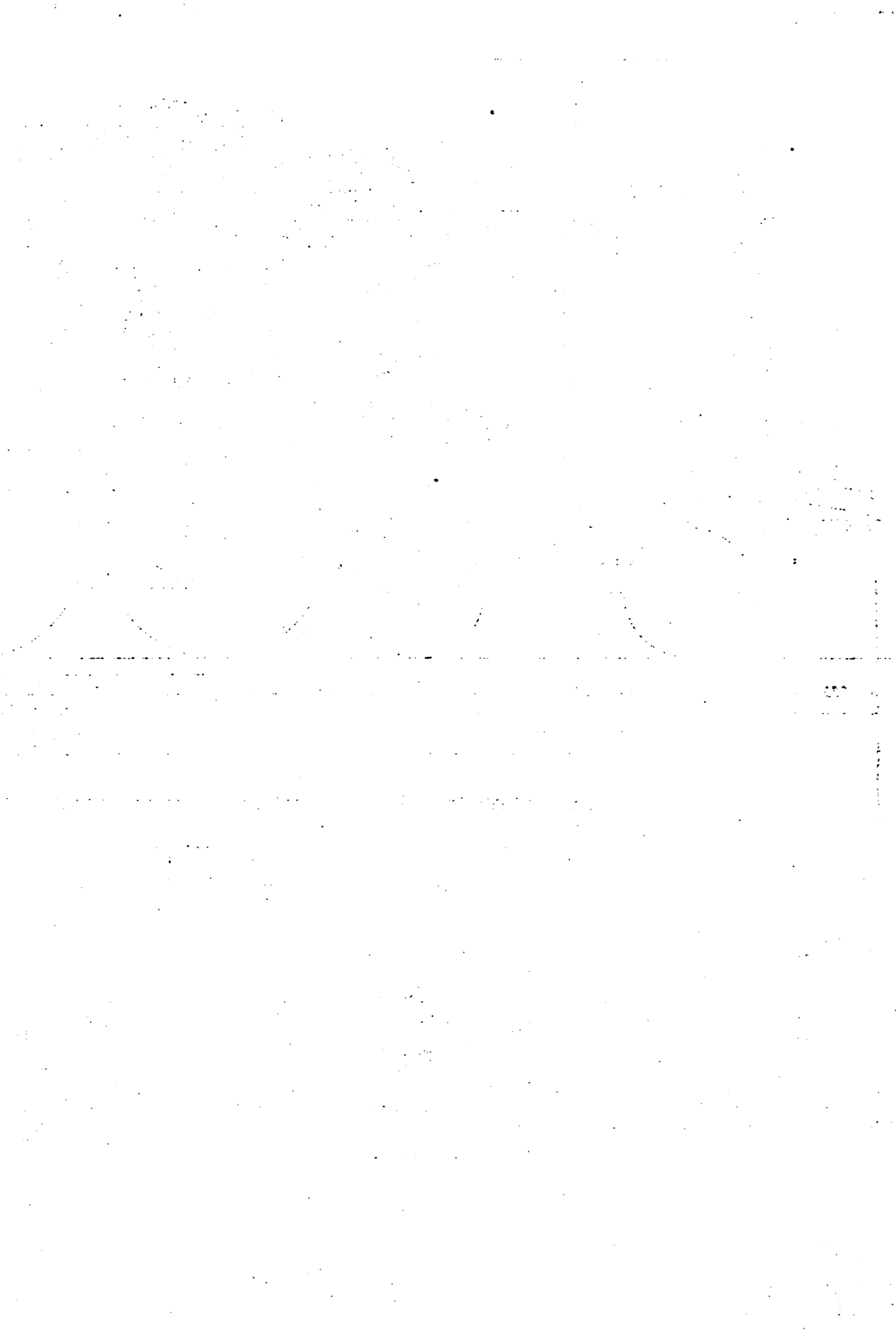

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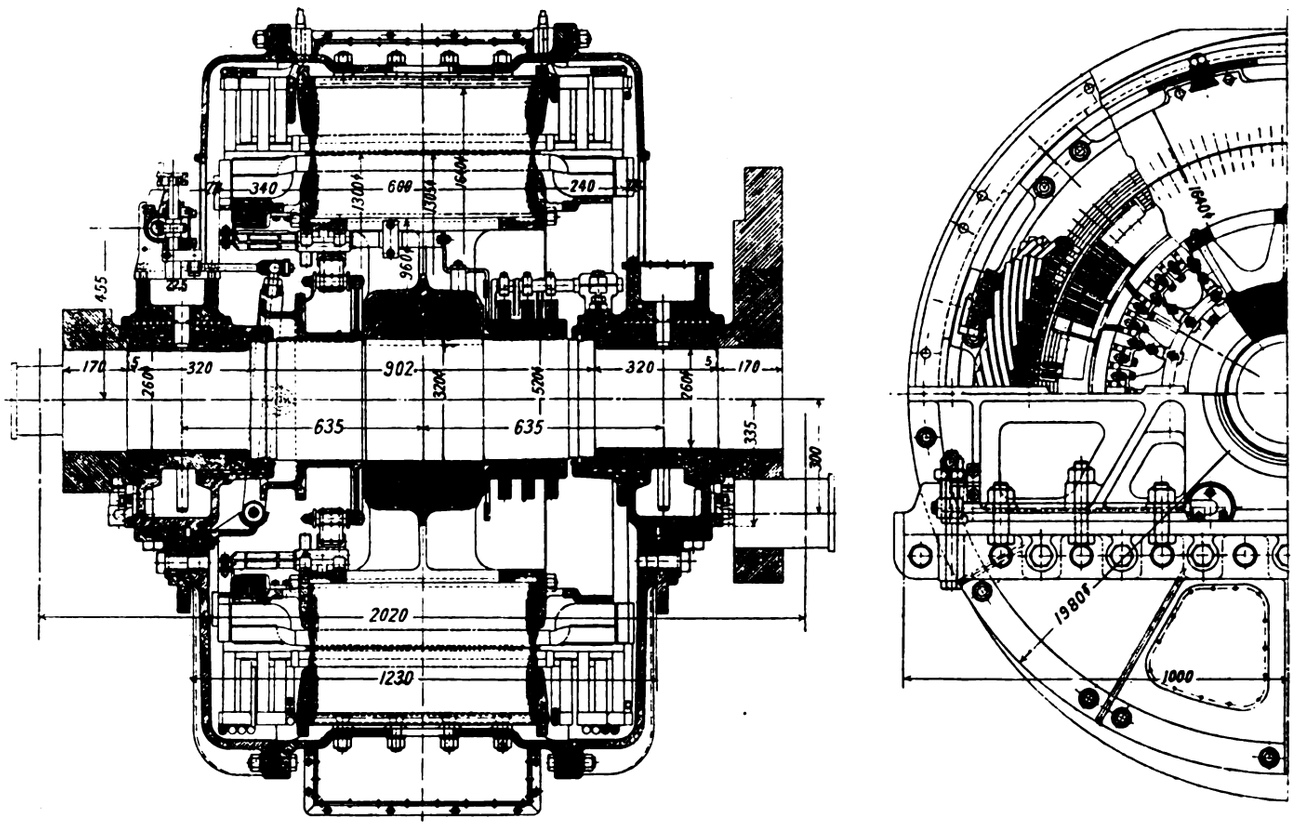
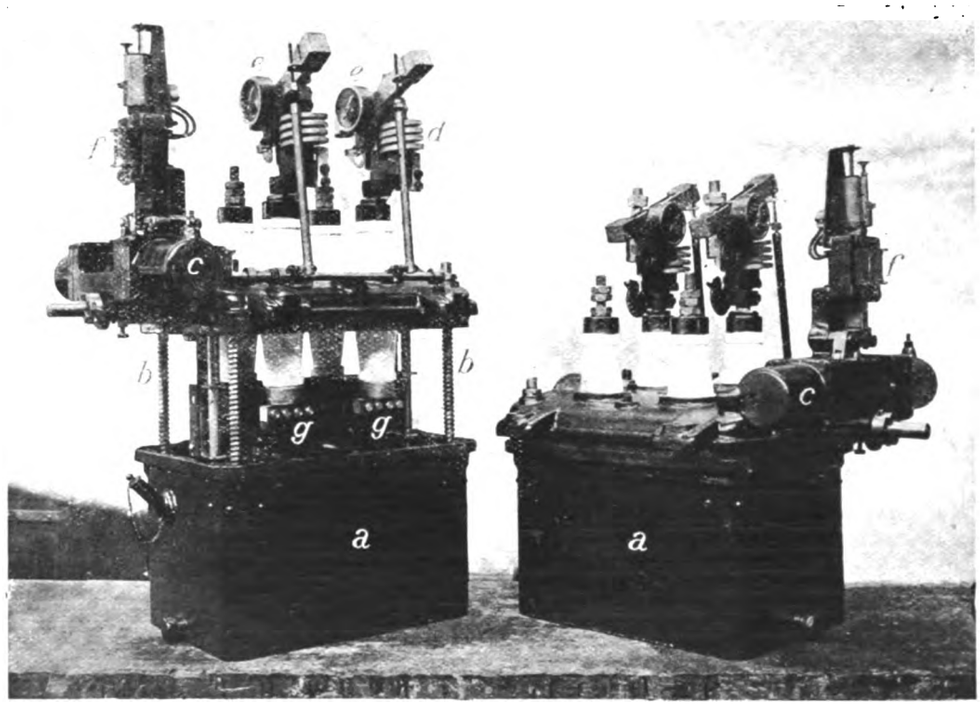


Sectional Views of Traction Motor.



a.—Oil case.
b, *b*.—Screws for raising and lowering cover.
c.—Air cylinders.
d.—Maximum current discharge coils.
e.—Time discharge.
f.—Mimimum current discharge coils.
g.—Fixed contacts.

Automatic Circuit Breaker for the Traction Motors.

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nearly so) run in one direction, the exceptions being principally for shunting purposes.

As already mentioned, all the important control appliances (automatic main switch, motor reversing switch, throw-over main switches for changing the number of poles in stators and rotors, speed regulator, star and delta connection switch) are operated by compressed air through one, two, and three-cylinder motors. Air for operating the main automatic switch can only be admitted into its motor after the auxiliary controller is set to allow one of the collector bows to be raised to the overhead wires, and this can moreover only be done to the main switch in one cab at a time; and similarly with the other apparatus, when one cab is used for driving, compressed air is cut off entirely from the other.

The handle of the subsidiary controller through which are operated the air compressor switches, and also the air valve admitting compressed air into the collecting-bow lifters and lowerers, is made removable, so that it can be taken off and used as a key to open or close the high-tension compartment on the locomotive. It can also be employed, by insertion through a suitable opening in the front of the main controller case, to free the interlocking mechanism that would otherwise prevent any movement of the main automatic switch and the resistance regulator with their compressed air gears even for testing purposes, so long as no current is entering the locomotive.

As regards the traction motors, the stator carcases and also the rotor wheel frames are of cast steel, carrying soft iron laminated cores; the coil windings of usual drum type are set in half open grooves. The motors are almost entirely enclosed, there being only two semi-circular openings for inspection purposes which are thereafter closed by removable plates. Air for ventilating and cooling the motors is forced from the fan into a ventilating space arranged in the periphery of the stator carcase and thence through the rotor.

The auxiliary mechanisms controlling the high-tension gear are set in oil baths from which they are lifted or into which they are lowered in each instance by four screws fitting through the iron oil case and lid carrying the gear. These screws are inter-connected by chains and toothed wheels, so that operating any one has the effect of operating all four.

As compared with the earlier type of electric locomotive—the 1-C-1 class—it will be seen that these new higher speed engines are three phase throughout, irrespective of running speeds. They do not require phase transformers, but, on the other hand, must be equipped with additional though less heavy apparatus for varying the number of poles. Series grouping is obtained by connecting up the rotors of the two traction motors, as well as by connecting the rotor of the primary motor with the stator of the secondary. The starting resistance and those for speed regulation are metallic, not liquid.

Gattie's Goods Handling Scheme.—Sir Albert Stanley, the President of the Board of Trade, received on November 23 a large deputation of members of Parliament and representatives of engineering, science, and commerce, who urged the necessity of dealing with the problems of transport in accordance with the scheme advocated by Mr. A. W. Gattie. Under this system for mechanical handling of goods and the creation of a central clearing house for rapid sorting, the employment of motor lorries would clear the streets of the congestion caused by horsed goods vehicles. It is estimated that the whole of the railway terminal work for goods traffic in London could be done at 1 per cent. of the space at present occupied, in 1 per cent. of the time now taken, and at 20 per cent. of the cost now incurred. The proceedings were private, but the deputation may be said to have been successful, for the President of the Board of Trade undertook to give the project a trial under Government transport auspices at some congested centre outside of London. The idea has thus advanced a long way since it was first received with derisive scepticism by railway experts.

INSULATING CLOTHS.

Messrs. Abbott, Anderson and Abbott have done good service to the electrical industry in this country by the establishment at Harpenden of adequately equipped works for the manufacture of insulating cloths. Their enterprise in this direction and the excellence of their product deserve to be better known. Insulating cloths are, of course, essential to the manufacture of dynamos, motors, and various other electrical apparatus, but for many years British manufacturers had to rely for their supplies upon foreign sources. From America first, then from Germany and Switzerland, we were able to obtain insulating cloth and tapes of good quality and in any quantity required; a key industry thus remained wholly in the hands of our trade rivals. The position early attracted the attention of Messrs. Abbott, Anderson and Abbott, who have long been well known as makers of oilskin and waterproof clothing, and in 1905 they set themselves the problem of producing as good insulating cloths as could be obtained abroad. The problem was by no means so simple as it looked, and success was not achieved at a bound. Gradually, however, trade and technical difficulties were eliminated; and in spite of keen competition and the complete indifference of those whose business it ought to be to foster home industries, they built up a steadily-increasing business.

The preliminary work and the long course of experiments form an interesting example of the success of special aptitude, aided by patience and foresight. The principal difficulties were the obtaining of the right kind of cambric cloth and the most suitable varnish for coating it. Then in order to make the manufacture commercially successful it was necessary to design special machines so that the whole process could be carried out with efficiency and speed. A volume might be written to detail the successive steps in the improvement of the product, but it is sufficient to say that in the course of a few years Messrs. Abbott established a high reputation for their insulating fabric, and built up a fair business. When the war broke out the demand largely increased, but early in 1916 progress was for a time interrupted by a fire which almost completely destroyed the Harpenden works. The firm at once began to design and equip new premises, but the difficulty of obtaining materials and machinery rendered the reconstruction a somewhat protracted business. While the work is not wholly finished, it is a notable achievement that in the present conditions a new plant capable of turning out 750,000 yards of insulating cloth in a year is now in operation. The output will be doubled when the rebuilding is completed.

The new works were built by Messrs. Trollope and Colls to the design of Mr. Charles W. Latter, with Mr. H. Kempton Dyson as consulting engineer. They comprise a number of well-lighted rooms and a large ferro-concrete tower, shown in one of the accompanying illustrations. Externally of severely simple design, the interior arrangements have been carefully devised for the purpose in view. The tower contains several shafts suspended from the upper storey and terminating at the first floor level. These shafts have double walls to prevent the diffusion of heat, which is regulated by steam pipes. At the base of the shafts are baths of insulating solution for the impregnation of the cloths. After immersion these are led up over drums driven by pulleys to the top of the building, then down the next shaft to a second bath, after which they are again drawn to the top of the tower. By the time the cloth has again reached the ground floor it has been sufficiently dried in the steam-heated atmosphere to be wound into rolls. Before the cloth is ready for this

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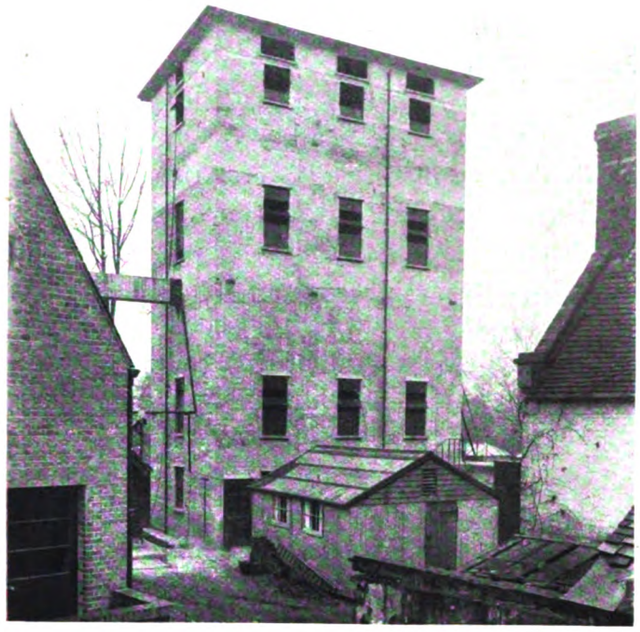
treatment it has to be cut and re-sewn on the bias. Cloth-makers weave the thread at right angles, and if the cloth were treated as it is received it would not have sufficient strength, and would fray when cut into strips. Special sewing machines with wide lockstitch have been designed, and after the cloth has been cut



Ferro-Concrete Tower in which the Cloths are Treated with Insulating Solution.

on the bias the pieces are sewn together by operatives who work in well-lighted rooms under excellent conditions. The cambric is supplied in thicknesses of from 5 to 15 mils, and the silk in thicknesses of from 4 to 6 mils. After being sewn in lengths up to one hundred yards, the cloths, which vary in width up to 38 inches, are taken to the tower and coated with black or transparent yellow insulating liquid. When this process is completed the cloth is inspected and rolled. It is then ready to be cut into tapes of any required

Cutting and Re-sewing the Cloth before Treatment.

width. This is done by a simple and ingenious machine, shown in Fig. 3. The roll is placed on a drum at the base and the fabric runs up over spindles fitted with a series of circular steel cutters, which smoothly and with perfect accuracy cut the cloth into tapes of any desired width, each section of tape being wound in a direction opposite to that of the next section.

By the courtesy of Messrs. Abbott, Anderson and Abbott, representatives of the technical Press were recently enabled to visit the new works, and an interesting and instructive morning was spent in inspecting the arrangements and the process of manufacture. On the occasion of the visit the firm were represented by Mr. W. G. Abbott, managing director, and his brothers, Messrs. F. Abbott, C. W. Abbott and E. Abbott, and Mr. Edgar S. Barralet, head of the sales organisation for insulating cloths, tapes, and silk.

The war has proved how important it is that Great Britain should be capable of manufacturing her own requirements in all necessary materials. Varnished fabrics and tapes are essential in the manufacture of heavy electrical machinery, and varnished silks for the magneto and instrument trade, and it is to be hoped that our manufacturers will, as far as possible, support the new enterprise.

DIFFERENTIAL GEARS AND RAIL CORRUGATION.

By R. H. Wilkinson.

(*General Manager and Engineer, Huddersfield Corporation Tramways.*)

Very little can be added to the account which I gave in The Tramway and Railway World of May 11, 1916, of the experiments which have been made on the Huddersfield Corporation Tramways with differential gears. As there stated, 11 cars fitted with such gears have been in operation on this system since October, 1914. The route over which these cars have run is six miles in length, and a ten minutes' service is maintained by cars fitted with these gears.

The result of my longer experience is that I am more firmly convinced of their utility for the purpose for which they were installed, viz., the prevention of the formation of corrugations on the rails. They have been in use for three years on a section of line which was in parts badly corrugated. The corrugations were ground out three years ago, and so far have not reappeared. The current consumption is the same as on an ordinary geared car, although the tire wear is not so great, as shown by the following figures. :—

	Differential gears. Miles.	Ordinary gears. Miles.
Average life of tires for ⅛ in. wear ...	= 3,625	3,553
,, ,, pinions	= 56,612	54,254
,, ,, gear wheels for 3½ in. wear	= 22,620	24,855

One or two of the gear wheel rims had to be changed through breaking, due to defective castings, which accounts for their life being less.

A Tape Cutting and Reeling Machine.

From the above it is seen that there is less wear of tires with the differential gears. This is really more pronounced than appears on the surface, because the comparison has been made with similar types of cars which run on another section where the track is in a much better condition, being more recently constructed and mostly double, whereas the differentially geared cars run on a length of line which is chiefly single and in a bad condition, some of it very bad.

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LONDON, DECEMBER 13, 1917.

Queues for Loading Cars.

Omissions stretching far back before the war have produced accentuated difficulties during the past three years. Industrial and commercial activity engendered by the needs of the Forces has so augmented the demand for passenger conveyance that a number of traffic authorities have been compelled to institute the queue system of loading. Even a health resort such as Bournemouth is experiencing the need. The tramway manager has been directed to report thereon, in consultation with the town clerk, as to the powers the tramway committee have, or would require, to carry the suggestion into effect. If a committee is in earnest there is no necessity to await the acquirement of powers. Proof of this contention is afforded by what has happened both before and since the war. There are numerous towns where queue loading has long existed without special authority having been acquired, and cases are not wanting of this example having been followed during the past eighteen months. As notable instances, Halifax and the London General Omnibus Company may be cited, while Bradford has secured from the Board of Trade a by-law under which queues must be formed at any stopping place at which more than six persons are waiting. The case of Halifax is interesting because of the adoption of a method that enables a number of queues to be formed without congestion at the termini of a number of routes. It has existed for years at the London County Council's Southwark Bridge terminus, and doubtless similar procedure obtains in provincial centres. By establishing the loading points at different places on both the inward and outward rails, a number of cars can be simultaneously filled. The adoption of this course would, no doubt, provide a remedy for the pushing now witnessed at the rush period at Victoria and other London termini, in consequence of which the borough councils have lately directed the attention of the police and traction authorities to the need for queues. Two or three years prior to the war the County Council secured statutory powers for queues, despite a police objection that Scotland Yard had no men to spare for the regulation of the system. At the present juncture it would be impossible for the Council to find a sufficient number of men to undertake the work, but it ought to be feasible for special constables to give aid. In Leeds the latter discharge the far more difficult work of regulating vehicular traffic at busy points, and the chief constable has lately devised a method of facilitating the carrying out of this duty at night, which might be usefully copied in London and elsewhere. Three electric lamps are employed, one showing red continuously on the back of the constable, and white and red lamps being carried in either hand. When the latter is visible oncoming vehicles must come to a halt until white is shown. Now that queues are the rule at food shops at certain hours in many populous centres, the example ought to facilitate the adoption of the system for passengers. Although it is more difficult to carry out for omnibuses than for tramcars, the London General Omnibus Company have been gradually bringing about its adoption during the past year. Efforts are now being made to secure extensions, and it is to be hoped that Sir E. Henry will facilitate the work of the management by granting the aid of special constables.

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National Tramway Committee. An indication of the increasing difficulty of maintaining means of local communication is the appointment at the instigation of the Government of a committee, which will be officially known as the Tramways (Board of Trade) Committee. Various preliminary steps have been recorded in earlier issues, and in the present number the narrative is, for the time at least, brought to a close. The foundation for the whole movement, put briefly, is the increasing difficulty which all tramway managers are experiencing in obtaining materials for maintenance and renewals, and also in keeping a sufficient supply of labour to continue services that are urgently required in the public interest. Such Government aid as has been given was divided between two departments, and hence was unsatisfactory. Several tramway managers who foresaw that matters could not longer continue as they were, urged the Board of Trade to take steps to deal with questions of supply that were becoming more urgent every day. The Government readily appreciated the necessity of keeping up the tramway services in numerous cases where the cars transport munition employees. The original idea of the Board of Trade seems to have been that there should be a tramway controller, but it was soon understood that the work could be better done by a committee. Negotiations were then opened by the Board of Trade and the Ministry of Munitions with the Municipal Tramways Association and the Tramways and Light Railways Association. The result was the formation of a committee, which at present consists of seven members, two appointed by the Board of Trade, three by the Municipal Tramways Association, and two by the Tramways and Light Railways Association. The duties and powers of the committee have not yet been fully defined, but they will no doubt be commensurate with the urgency of maintaining the tramway services of the country as far as possible under the present conditions. One of these duties, for example, will be to see that rails are made available for essential tramways requiring track renewal. Authority will also be given for the provision of additional cars where these are necessary. Steps may be taken to prevent further depletion of labour, and the help of the National Service department may be enlisted in providing the men requisite to maintain the services essential to the production of munitions. Not all tramways come under this category, and some undertakings where traffic is light and non-essential may have to submit to temporary curtailment or even abolition of services. The committee, which is fairly representative, may be trusted to act in such a way as to produce a minimum of hardship subject to ensuring services deemed indispensable. The position will be quite different from what it might be were similar powers to be exercised by a Government department knowing little or nothing about the business, its needs, and its circumstances. Every member of the committee is a tramway expert, thoroughly familiar with the exigencies of tramway operation.

Development Procedure. The insignificant number of tramway extensions included in the fifty applications for Acts and Provisional Orders next Session is not to be regarded as representative of local and national needs for increased transportation facilities. The war has enforced a suspension of all but imperative expenditure. Within this category fall the few applications relative to tramway extensions. The more numerous requests to the legislature and the Board of Trade relative to electricity undertakings represent work that must be executed either immediately or in the near future. These might have been even more numerous but for the linking-up schemes now under consideration at the instance of the Board of Trade. A number of these when carried into effect will have an important bearing upon the security and extension of traction loads. Present and future tramway extension requirements are to be found in the schemes that have been formulated in response to the request of the Reconstruction Committee for information as to the amount of municipal work to be put in hand after the war. Without doubt, their number will be added to when the conflict comes to an end and projects for making up the deficiencies of housing accommodation are translated into bricks and motor. Besides that development, traction authorities may be affected by the extent to which national effort will be directed to repopulating the country-

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side, in view of the paramount importance which native agriculture has attained in the maintenance of our existence. That tramway authorities are alive to the questions of housing and food production was shown by the reception given to Mr. A. Ellis's paper on development of tramways at the conference of the Municipal Tramways Association. There was unanimity as to the part that electric and, in its sphere, motor omnibus traction can play in the directions to which we have referred. Insistence was also placed upon the need for devolution in the method of granting tramway powers, and for removing the hindrances set up by outside local authorities. Possibly these desiderata would be attained if more municipalities followed the example of Sheffield and established a Development Department. This important work has been deputed to a new committee of the Corporation, who were also desirous of appointing a separate executive officer. It was found, however, that none of the forty applicants had had special experience of the work of a municipal authority, which the committee considers most desirable, if not essential. Under these circumstances the deputy town clerk has been appointed to the position and relieved of some of his present duties. We would suggest that in many places it would for good reasons be wise to combine the post with that of manager of the tramways. It is noteworthy that Sheffield's Development Committee recommends that for advisory purposes the principal officers of the Corporation, particularly the general managers of the tramways and motors and the electric supply departments, the city surveyor, the city architect, and the improvement surveyor be asked to co-operate to the fullest extent possible. This is a wise provision that has worked well in localities where town planning schemes have been formulated. The latter task ought to go hand-in-hand with tramway extension, and it is desirable that wherever there is land available for town planning, the preparatory work should not be delayed until after the war. In this respect the example of the Special Committee of Birmingham Corporation on road widening and new construction is to be commended. An outcome of it are the important recommendations submitted by Mr. Alfred Baker, the tramways manager, for future extensions and the method of working by single-deck two-car trains running on a reserved track. This innovation promises to revolutionise the cost of operation, and by its general adoption it should provide the system required for effectively developing outer urban and agricultural districts.

Rule of the Road and Tramcars. Inquiries have recently been made by several correspondents as to the exact state of the law and the liability of drivers of vehicles in regard to the passing of tramcars when overtaking. In reality there is, we believe, no uncertainty about the matter. In the early years of the present century, when motor cars began to come into general use, the rule of the road for drivers when overtaking tramway cars was found to need alteration. The Motor Cars (Use and Construction) Order, 1904, contained provisions which were interpreted to mean that a motor car overtaking a tramcar must pass on the off side. This simply applied the ordinary rule of the road to the case of overtaking a tramcar. As the latter, however, cannot deviate to the near side of the street, accidents arose in the process of passing, either through the motor car when on the off side meeting another tramcar or some other vehicle or running into pedestrians. This was the more likely to happen as the motor car driver could not see ahead until he had emerged to the right from behind the tramcar. The interpretation of the Order of 1904 was confirmed by a judgment in the case of Burton *v.* Nicholson, in the King's Bench Division, in the beginning of 1909. A tramcar was there held to be a carriage, and therefore the ordinary law applied. The Court, however, expressed the view that the law ought to be altered. In the following month (February), therefore, amending Motor Car Orders were issued by the Government, both for England and Scotland, under which the driver of a motor car was left to use his own discretion as to which side he should take in overtaking a tramcar, but the onus was left on the driver to use all proper care. A similar latitude was about the same time given by the Chief Commissioner of Police in Ireland. So matters have remained ever since. It was not long, however, before serious trouble arose from the discretion given to the

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motor car drivers and apparently to the drivers also of horse-drawn vehicles. When a tramcar is at a stopping place and passengers are getting out and in, drivers of other vehicles pass on the near side even more frequently than on the off. The tramcar passengers are scattered, and sometimes serious and even fatal accidents are caused. This subject was frequently discussed, and, notably, in February, 1913, by Mr. A. L. C. Fell, general manager of London County Council Tramways, when giving evidence before a House of Common Committee which was inquiring into the cause of accidents from power-propelled traffic in London. No legislation has been passed on the subject, but in one instance a remedy has been found for a particular town. This is the case of Glasgow, which, in April, 1915, secured the confirmation by the Secretary for Scotland of a series of by-laws for regulating the traffic in streets within the city. One of these by-laws provides that when a tramcar is standing at a stopping place every driver of a vehicle who intends to pass on the near side shall draw up immediately before arriving at the stopping place and wait until the roadway is clear of passengers entering or leaving the car. It will, no doubt, be generally agreed that it is not desirable to go back to the old law that the vehicle overtaking a tramcar must pass on the off side in all circumstances, but if liberty is allowed to pass on either side, some such rule as the one in use in Glasgow is obviously a great advantage for the safety of the public.

Traffic Receipts.

The financial year of most of the municipal tramway undertakings of the country is now well advanced, while others and also the company undertakings are removed by some months from the dates when their twelve months' reckonings began. It is accordingly practicable to form an idea as to how receipts are going to run for the current year. Were it not for the fact that working expenses are higher, a glance over the list of aggregate traffic receipts indicates that the tramways of the country are in a state of great prosperity. Out of 68 undertakings whose aggregate traffic revenue to date we quote regularly, there are only five which show decreases as compared with the corresponding periods in the preceding year. These decreases, moreover, are small. In the majority of the other 63 cases, the increases revealed are substantial, and in some instances they are enormous. To look at matters from another point of view, take the traffic summary paragraph which is given at the foot of this column. It deals with traffics for the week ended November 24 on 38 of the principal undertakings. For a long time the weekly average revenue per mile of track open has substantially exceeded the figure for the corresponding weeks of last year. Indeed, for long the increase has on the average been above £10 per mile of track, or considerably over 10 per cent. It is, of course, the fact that a number of the undertakings have increased their fares in order to meet the higher expenses, but others have not. In the latter instances the rise in revenue has come from increased numbers of passengers. In fact, through activities connected with the war, the business with which many of the tramways have to cope with their reduced staffs is at times almost overwhelming. Even after allowing for heavy expenses and war allowances, it is quite likely that many of the tramways will at the end of the financial year show highly favourable results—as some did last year. But the careful manager will recognise that part of his surplus is fictitious. It represents money which in the ordinary way would have been spent either out of revenue or out of reserve for maintanance and renewals. The work of upkeep having been so largely suspended, owing to difficulties regarding both materials and labour, it is necessary to put aside large available surpluses to meet the time when after the war great sums will have to be spent in order to overtake arrears of maintenance.

A WEEK'S TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended November 24 give total receipts of £195,727, or £37,804 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £96 9s. 4d. per mile of single track, and last year at the rate of £77 10s. 8d., thus showing an increase for the week of £18 12s. 8d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

Board of Trade and Track Inspection.—Complaints having been made to the Board of Trade by Musselburgh Council of accidents on the local tramways, the Board replied that "the responsibility for the proper maintenance of the undertaking rested with the promoters, and that the Board did not carry out any system of periodic inspection of tramways." The Council are dissatisfied with the reply, and propose to take further steps with the company.

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THE NATIONAL TRAMWAY COMMITTEE.

The following are the members of the National Committee of Tramway Managers, the formation of which, at the instance of the Board of Trade, was reported in previous issues :—

James Devonshire (chairman), managing director, London United Tramways, Limited, the Metropolitan Electric Tramways, Limited, etc.

A. L. C. Fell, general manager, London County Council tramways.

J. B. Hamilton, general manager, Leeds Corporation Tramways.

J. M. McElroy, general manager, Manchester Corporation Tramways.

A. R. Fearnley, general manager, Sheffield Corporation Tramways.

R. J. Howley, joint manager, British Electric Traction Company, Ltd.

Stephon Sellon, consulting electrical engineer.

For the information of the members of the Municipal Tramways Association, the following summary was issued with reference to the negotiations which took place previous to the appointment of the committee and to the decisions which were arrived at by the Executive Council in regard to the matter :—

" In response to the request of the President of the Board of Trade, the Council of the Municipal Tramways Association, together with the Council of the Tramways and Light Railways Association, attended at the Board of Trade on November 2, and met the President (Sir Albert Stanley), together with representatives of the Ministry of Munitions. The President made a short statement suggesting the advisability of the appointment of a Controller to deal with tramway matters, and stated that he had seen Mr. James Devonshire, and that Mr. Devonshire had agreed to accept the position.

" The Executive Council of the Municipal Tramways Association pointed out, however, the serious objection which would arise by the appointment of a single Controller, as announced by the president, and they recommended to him the appointment of an Executive Board under the chairmanship of the gentleman already suggested as Controller.

" As a result of the conference which took place, the following letter was received from the Board of Trade :—

" ' November 10, 1917.

" ' Sir,—I am directed by the Board of Trade to state for the information of your association, that the President of the Board has decided, in view of the serious difficulties under which tramways are at present labouring, to set up an expert committee to consider the needs in respect of materials and labour of tramways essential to the prosecution of the war, and to take such steps as may be necessary to supply such needs even at some temporary sacrifice on the part of the less essential undertakings. The President is confident that he can rely on the assistance of your association in this important matter, and he would be glad if the Municipal Tramways Association would be good enough to nominate at the earliest possible moment three representatives to serve on the committee. I am to add that it is proposed that Mr. James Devonshire should be the chairman of the committee.—I am, Sir, your obedient servant,

ERNEST J. MOGGRIDGE.'

" The Executive Council of the Municipal Tramways Association held a meeting in Manchester on Wednesday, November 14, and nominated the following three gentlemen to serve on the committee : Mr. J. B. Hamilton (chairman of the Executive Council), Mr. J. M. McElroy (past-president), and Mr. A. R. Fearnley (hon. secretary).

" The committee therefore will now consist of the three representatives nominated by the Municipal Tramways Association, Mr. A. L. C. Fell, representing the London County Council Tramways (nominated by the Board of Trade), two members nominated by the Tramways and Light Railways Association, chiefly representing company-owned tramways, and the chairman (Mr. James Devonshire), nominated by the Board of Trade.

" Up to the present we are informed that the question as to exactly what matters are to be referred to the committee has not been settled.

" The President and the Executive Council requested me to give this early intimation setting out what had passed in regard to this question for the information of all the members of the Association, and also to clearly point out to them the fact that the municipal interests which so largely predominate in tramways were being adequately safeguarded by the Executive Council.

" It should be noted that the composition of the committee provides for four Municipal Tramways Association representatives and two Tramways and Light Railways Association representatives and the chairman, so that no question is likely to arise regarding undue prominence being given to company interests to the detriment of municipal interests.

" A. R. FEARNLEY, Hon. Secretary.

" Division Street, Sheffield. November 15, 1917."

LONDON COUNTY COUNCIL'S ATTITUDE.

At a meeting of the London County Council, on November 27, the following report by the General Purposes Committee was submitted :

" A letter in terms as follows having been received from the Board of Trade, we decided to ask the Highways Committee for their views thereon—

" ' November 10, 1917.

" ' Sir,—I am directed by the Board of Trade to state, for the information of the London County Council, that their attention has been called by the Ministry of Munitions to the fact that some of the tramway systems of this country essential for the production of munitions of war are, owing to the difficulty in obtaining material and labour for repairs, reaching a condition in which a serious breakdown may be expected unless steps to provide a remedy are taken forthwith. In these circumstances the Board propose to appoint an expert committee to whom these matters could be referred, and who would take such steps as they may see fit, subject to the approval of the Board, to meet such needs. The Board recognise that for its successful working the co-operation of the London County Council is essential, and they would therefore ask the Council to be so good as to authorise Mr. A. L. C. Fell to serve on the committee. The Municipal Tramways Association and the Tramways and Light Railways Association will be invited to nominate three and two members of the committee respectively, and it is proposed that Mr. James Devonshire should be the chairman.

" ' The Board trust that the Council will understand that there is no intention to interfere with the control of the tramways, subject to the considerations indicated above. It might, for example, be necessary in some cases where tramways of one authority were deemed to be essential, and materials for necessary repairs were otherwise unobtainable, to require another undertaking to provide such materials either by conversion of double to single line, or by temporarily abandoning certain routes altogether, and transferring both track and rolling stock to routes of the other undertaking.

" ' The Board have no doubt that the Council will willingly co-operate with them in the object they have in view.—I am, Sir, your obedient servant, (Signed) ERNEST J. MOGGRIDGE.'

" The Highways Committee have informed us of the circumstances which have led up to the appointment of the expert committee, and they express the opinion that the committee set up by the Board of Trade should be constituted on a basis securing representation of the municipal and private interests concerned proportionate to their magnitude. The Highways Committee further express the view that it is important that the chairman of such a committee should be entirely free from association with any traffic undertakings likely to be affected. Failing any change in the proposed constitution of the committee, in regard to which the Council has not had an earlier opportunity of expressing an opinion, and having regard to the practice of the Council since the commencement of hostilities to avoid all action tending to delay or in any way embarrass the work of H.M. Government, the Highways Committee consider that the Council should, at the earliest possible date, permit Mr. A. L. C. Fell to serve on the proposed committee. We entirely endorse the views expressed by the Highways Committee, and we recommend :—

" (*a*) That the Council considers that the expert committee set up by the Board of Trade in connection with the management of tramway undertakings should be constituted on a basis securing representation of the municipal and private interests concerned proportionate to their magnitude ; and that it is important that the chairman of such a committee should be entirely free from association with any traffic undertakings likely to be affected, and therefore that the appointment of an interested party as chairman is unfortunate.

" (*b*) That, having regard to the practice of the Council, since the commencement of hostilities, to avoid all action tending to delay or in any way embarrass the work of H.M. Government, and on the understanding that the Council is in no way committed as to its policy, Mr. A. L. C. Fell be permitted to serve upon the expert committee appointed by the Board of Trade in connection with the management of tramway undertakings."

The report and recommendation were agreed to unanimously.

PROTESTS FROM SCOTLAND.

The Glasgow Corporation Tramways Committee have appointed the convener (Mr. Montgomery) and the conveners of the sub-committees, with powers to take steps, in conjunction with other tramways authorities in Scotland, to impress upon the Board of Trade the necessity for Scotland being represented on the National Tramways Committee.

Direct representation of Scotland was claimed by the Scottish Tramway Officials Association at a meeting held in Stirling on December 6. A resolution was unanimously adopted pointing out that there is no member directly representing Scottish tramway undertakings who is resident in Scotland, and that owing to the large number of munition workers carried on these tramways this would be detrimental to national interests, and urging that Scottish interests should be directly represented. Mr. Dalrymple, of Glasgow, and Major Coutts were appointed as a committee to meet the Board of Trade.

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THE PROVISION OF TRAMWAY FACILITIES BETWEEN EDINBURGH AND QUEENSFERRY.*

By A. Horsburgh Campbell, M.Inst.C.E.
(*Burgh Engineer*).

The provision of transit facilities between the city and Queensferry is not novel, as the following *résumé* of the earlier essays in this direction will show. In the Parliamentary Session of 1902 a project for a tramway *via* the Dean Bridge was lodged under private auspices, but having failed to receive the necessary consent it was not further pressed. In the Parliamentary Session of 1905 a bill for the promotion, by a company, of a tramway between Comely Bank† and Queensferry engaged a Joint Committee of the Lords and Commons in Edinburgh for three days, at the close of which the Committee decided that the preamble was held "not proved." The opposition to the bill was strong. It was at the instance of two railway companies, the Linlithgow County, and of certain private gentlemen. The promoters showed much zeal and determination, being thoroughly convinced as to the soundness of the proposal from a financial standpoint, but the combined opposition of county and of railways, etc., prevailed against the effort of that date.

Since that Parliamentary effort of 1905 the conditions of the area have undergone much development, favouring and encouraging the provision of transit facilities, commensurate with the needs. If in 1905 the conditions and prospects were good, they are very much better to-day.

The new conditions are: —

(1) The Rosyth Naval Base—not then begun -is now an accomplished fact.
(2) The favourable attitude of the Admiralty towards the Corporation.
(3) The increase of motor traffic.
(4) The near expiration of the cable tramways lease.
(5) The contribution of such a tramway to the city's health and commerce.

Dealing briefly with these five leading changes in the conditions since 1905: —

(1) This naval base has already brought in its train other engineering works situate and distributed along the shores of the Firth, and these are still upon the increase. Such industrial growth necessarily means an imported population—of a permanent kind—who are already seeking in great part their residence within or upon the confines of the city, and to whom speedy, efficient, and cheap transport is a necessary part of their daily life, and therefore a source of revenue to the city as the tramway undertakers.

But in an even larger sense than the above the importance of the base in its influence upon the industrial, commercial, and social life of the area embraced by this survey cannot be over-estimated, and those benefits will accrue in greatest measure to that community and authority which sets itself sedulously to cultivate quick, frequent, and efficient communication between the "Ferry" and the city.

(2) In the earlier efforts described, the recognition of the Admiralty as a factor in the situation was probably not considered, because it was at those dates too remote, but as evidence of the changed conditions that department has, in their official communication to the Town Council, stated their view of the matter, which may be summed up in the following phrase, "easy and constant communication to Edinburgh cannot but prove beneficial."

This expression of the department gives to the proposal an added value and interest, particularly in its preliminary stages, and may, I think, be considered as ensuring the ultimate—if not, indeed, the immediate - success of the scheme in its financial results. Upon this primal aspect of the question, estimates of capital and operating costs, and the resulting profit or loss have been carefully prepared, and will be presented to the committee at their meeting.

(3) That this means of "easy and constant communication" is in demand now, and is therefore a service of present necessity, is daily evident to even the casual observer, either at the city motor terminus or at Queensferry. Traffic observations taken enable a close approximation to be formed of the number of passengers to and fro on this Queensferry route, and these are of much assistance in the framing of a reliable estimate of the existing traffic as a basis of anticipation of the traffic which will be developed by a tramway guaranteeing a regular, fast, frequent, and cheap service between the city and Queensferry and *vice-versâ*.

Many of the conveyances run "full-up" even to overflow during the busy hours of the day and of evening; further, the service lacks the benefit of, and is unburdened by, those statutory obligations properly imposed by Parliament upon a tramway undertaking operating for the public benefit. The service at those busy times partakes largely of the nature of a "through service," stopping to let down where desired, but having little if any seat margin available to pick up passengers *en route*, and therefore not accommodating efficiently the intermediate population. This is a defect inherent to any motor service on a route which demands for the multitude such constant and cheap transport of a "through" as well as of an intermediate kind.

As the result of a careful study of this question in all its phases, I have formed the opinion that the carrying trade as at present developed is but the nucleus of the trade that is still waiting to be done along this route, for its extent is not to be reckoned by reference only to motor traffic of the "through" or all-the-way kind from the city to Queensferry and *vice-versâ*; there is that "intermediate" business from villages (*en route*), viz., Dalmeny, Cramond, Barnton, Davidson's Mains, and Blackhall, which collectively are of real account and value in their contribution of passengers to a tramway service.

Further, besides motor transport there are the other means of travel to and from Queensferry and neighbourhood, which afford a daily demonstration that the number of travellers or passengers within this area must already aggregate to a large total. But it is not even upon the fixed population that the success of this particular route will depend. It is, in addition, the moving and visiting population, and the traffic they will bring to the tramway. The traffic statistics have been taken at a time when there is an absence of the usual throng of holiday visitors who make the city their resort in peace times. What this traffic will amount to under such normal summer conditions, and with a service adequate, convenient, and cheap, may be more readily imagined than conveyed in figures. But the service will be not for pleasure only (although the attractions of scenery *en route* are in themselves unique); it will be one for business also of an all-the-year-round kind, serving an important national interest and convenience in connection with the base and its subsidiary requirements. From the careful traffic records which have been made for information of the committee it will be apparent how ripe is the field for a tramway, giving cheap and quick service, both of a "through" as well as of an intermediate kind *en route*.

Incidentally, it should be observed that the development of public motor traction has added greatly to the highway costs, and therefore the local burdens in respect of highway maintenance. The extent of the added burden upon the three highway authorities affected, that is, the City, the County of Midlothian, and the County of Linlithgow, is a consideration which must influence the two County Councils in their relation to this proposal, and which particularly affects the city as the highway authority for a distance of 2⅓ miles of city road traversed by the Queensferry motor vehicles.

(4) This is a coincidence of most opportune kind, avoiding all difficulties or complexities of operation, and dispensing with the need to negotiate with the Corporation's lessees, as in previous tramway extensions.

The Corporation have thus, for the first time in their life as tramway undertakers, a free field for decision, unfettered by any other interest than that of the public. This simplifies the determination of this question; the only uncertain and retarding factor being that of the war. Unless the Government view this project as essential for immediate National Service—and there is much to support this view—its execution must stand deferred until after the war. Meantime in the interval the necessary powers may be sought, as in the recent Corstorphine and Redford Tramways promoted by the Corporation, and authorised by Parliament (May, 1916).

(5) A suburban tramway line, such as that under review, is not to be regarded merely as a medium of transport; it is potent in the facility it opens for the recreation of the people in the wider sense, and the health of the citizens of every class and age. An excursion into and through this picturesque area, possessing such attractions, cannot fail to react beneficially upon the public health. It also promotes the commercial progress of the city in attracting hither for their business and for their residence newcomers to the area of the Forth, who, but for the facilities offered by such a tramway, would tend to go elsewhere than Edinburgh for their residence and their supplies. Further, it will become the link that can unite physically those interests and industries—marine, mining, and engineering —which of necessity are distributed and spread along the southern coast line of the Firth, and the country adjoining, from East to West Lothian.

City Termini, Routes, System, etc.

A brief description of the suggested termini, also the route, or alternative routes, which are available, is here necessary. In the plans prepared two routes are submitted for consideration; these are—Route No. 1, *via* the Dean Bridge, and, alternatively, Route No. 2, *via* Comely Bank. Both of these routes are governed by one cardinal point essential to the success of the scheme: that is, a through service upon the same car from a convenient centre or terminus in the city to the terminus suggested at Queensferry, that is, the "Hawes" Pier. Any proposal which falls short of this continuity, and which landed the passengers at, say, Comely Bank, and there "Change!" or, alternatively, North of the Dean Bridge, is unthinkable as a practical proposition.

Having this in view, Route No. 1 takes its start from a terminus already authorised for tramway; that is, in Hope Street, thence along Queensferry Street, Dean Bridge, Queensferry Road, Blackhall, Davidson's Mains, Barnton, Cramond, Dalmeny, and onwards to

* A Report presented to the Tramways Committee of Edinburgh Corporation.

† The Dean Bridge route not having received the consent of the Corporation.

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Queensferry. Route No. 2 has its start at the south end of Hanover Street (Hanover Street—opposite the Mound—is preferred to Frederick Street, because the Mound is a recognised traffic centre, which is an asset of value to a tramway), directly opposite the Mound, thence along Hanover Street, Queen Street (north side), and along the cable route to Stockbridge, Comely Bank, and thereafter continuing along the road towards Craigleath Station, whence its course to Queensferry is identical with Route No. 1.

It may be claimed that these two routes, at their city end, are not in reality competitive or alternative, but are complementary to each other; for in any complete system of city tramways, such as will be hereafter developed, both of these routes are natural tramway arteries. Both the termini suggested are good, and each has its own advantage over the other; thus Hope Street, if chosen as the terminus for the time being of Route No. 1, provides the naturally direct and shortest route from the city to Queensferry *via* the Dean Bridge, whilst with Hanover Street (Route No. 2), it is more centrally placed, bringing the Queensferry traffic to a commercial centre already associated with such traffic, and situate midway between the two railway stations.

Dislike of a tramway of whatever form laid across the Dean Bridge as it now is, may be disposed to hastily condemn this Route No. 1 without full regard to all the possible combinations of tramway traction. It is therefore respectfully asked that an open mind may be preserved upon this point until full knowledge is obtained upon these highly technical details.

In a report some time ago submitted by me (upon instruction of a sub-committee) dealing with several outlets from the city to Queensferry, I concluded as follows:—"I am of opinion the straight route (*via* the Dean Bridge) is that to be preferred for a tramway route;" and, further, "I do not consider the Dean Bridge as a suitable place for the putting up of overhead wires." I consider that it may be found not impracticable to operate the tramway service across the bridge without the overhead wires, not because they are in any sense ugly, for they are not; but because here, the valley and the bridge, in their combination, have a character all their own within the city. The bridge is absolutely "open," it has no overhanging foliage as a foil to the wires, and it can never have, it as is elsewhere possible; and for this reason, and considering that its length is very limited, it may be admissible that the æsthetic consideration should here prevail; provided always the alternatives are feasible, and are found to be reasonably economic. But as in any case this event will not accrue for a considerable period, this is a technical detail which may be left over for actual decision at a later date.

Having regard to the advantages which both of these routes possess, it may be thought desirable that in any powers necessary to be obtained from Parliament both may be included in the application, and leave the order of their execution to be decided as and when this eventuates.

From Craigleith to Queensferry these two routes, being along identical lines, are thence treated as one. As such the route may be either (1) partly upon the road and partly on and through the fields—*ex adverso* of the road; or (2) along the road for its entire length.

Dealing briefly with these two alternatives,

(1) *Partly Upon the Road and Partly On and Through the Fields.*—This combination or alternation of road and of field presents much advantage, thereby the road is adopted where the conditions are suitable, and it is avoided where the road is not so suitable and where a field track is available. In the plans submitted these conditions are carefully worked out, so that at certain points the tramway leaves the road, enters the field, and in turn rejoins the road at convenient points where field passage is not reasonably practicable. In this way those lengths of road (although not unfit), such as along the Cramond Bridge and parts westward therefrom—in Linlithgowshire—against which objection might conceivably be taken by the County Council, are mainly avoided. Thereby a large capital sum is saved, and considerably increased speed or rate of car travel is obtained. Convenient and frequent connections with the highway are provided, so that passengers are not lost to the tramway traffic nor inconvenienced in joining or leaving the car.

In the aggregate, the measurements of road tramway and of field tramroad are:—

	Route No. 1. To Queensferry *via* Dean Bridge.	Route No. 2. To Queensferry *via* Comely Bank.
Extent of tramway on road	3 miles	3⅜ miles
Extent of tramway in fields	5 ,,	5 ,,
Total ...	8 miles	8⅜ miles

The saving of time by this combination, as compared with adherence to road all the way, for each single journey, is quite five minutes (probably more), which is the equivalent of a substantial annual economy in operation, quite apart from the saving in capital cost of construction.

There are precedents for this method of tramway formation in Scotland, along kindred routes of open undeveloped country, as, for instance, the Paisley (Rouken Glen route), the Fife Tramways, and the Rothesay Tramways; whilst in England there is the well-known Blackpool-Fleetwood line. Recent town planning developments adopt this form of field or of grassed tram track either along the centre or by the side of highways, as at Liverpool and Southend (Essex), etc; and in the city's own promotion of 1915 for the Braids to Redford line the field track formation in first instance is that proposed to be adopted.

(2) *Upon the Road for the Whole Length.*—This is the more ordinary line or position for a tramway, and has certain advantages, such, as in this case, very slightly shorter, by about 200 yards in the eight-mile length, and it brings the tramcar to the eye of every possible passenger on the road; but these advantages are hardly mentionable when compared with the economy of cost and the higher speed obtainable by the combination before described, and which I beg to advise.

So planned, the approximate time which will be required to cover the journey from City to Queensferry is:—

Route.	Distance.	Time.
Hope Street *via* Dean Bridge to Hawes Pier, Queensferry	8 miles	36 min.
From Hanover Street *via* Comely Bank, to Hawes Pier, Queensferry	8⅜ ,,	41 min.

Although the route in its western half is undulatory, the gradients are all quite negotiable; the steepest incline being the "Hawes" Brae, equal to 1 in 9 for a short distance of 200 feet. The gradients generally are not exceptional for hilly systems, and need not create anxiety. Dundee, Bradford, Halifax, Huddersfield, Sheffield, and Leeds Tramways have inclines of approximate grade. The system advised for the tramway is the overhead electric, with the possible exception of Dean Bridge, as before described. The gauge of tramway would be, of course, the city's adopted standard of 4 ft. 8½ in., and laid as double line throughout.

The frequency of service would be every ten minutes each way for, say, sixteen hours daily, and a five or seven minutes' service for the city portion; with the added service necessitated by the summer rush, and the possibilities of workmen's car facilities morning and evening. For these two contributions to revenue no credit is taken in my estimate of earnings.

In presenting the estimates of capital cost, allowance for unsettled conditions of the present will be readily conceded, but the committee may feel assured that substantial additions have been made to the estimates over those that would rule in peace time, and they are such as are anticipated may rule for some time post-war. Estimates of revenue and of operating costs have been likewise prepared, and these will be presented at the committee. It will, I think, be found that my estimates err somewhat upon the side of caution, but as to this I would welcome the opinion of a tramway manager should the committee concur in this suggestion. In arriving at my estimates of the probable earnings of the line, I ought to state that I have been much assisted and agreeably surprised by the results of a careful study of the worth and working of certain suburban and rural tramway lines leading out of other towns, such as the following, viz.:—

Name of Town or System.	Length of Route into Country from Centre of City.	Nature of the Line.	No. of Years in Operation.	Revenue per Car Mile per annum.	Frequency of Service.	Car Mileage per Annum.	*Single* Fare per Journey.
Aberdeen ...	5 miles	Suburban and Rural	14	11·28d.	24 mins. normally, with increase during week-ends	70,600	3d. for 5 miles, 2d. for 3 miles
Dundee, etc. ...	7½ miles	Suburban and Rural	11	12·17d. to 15·127d.	Average about 15 mins.	120,000 to 160,000	4d. for 8 miles
Paisley	7¼ miles	Rural... ...	6	Well over 1s.	Every ¼ to ½ hour, with 5 and 10 mins. intervals in season	311,000	5d. for 7 miles
Blackpool-Fleetwood	8 miles	Inter-urban	18	17·07d.	Average about 9 min. apart; much more frequent in summer; less frequent—about 15 mins.—in winter	601,906	6d. for 8 miles
(Suggested) Edinburgh to Queensferry	8 miles	Suburban and Rural	...	1s. (estimated)	10 mins. from 8 a.m. till 12 midnight. Extra service for workmen.	700,000 (approximate)	6d. for 8 miles (suggested)

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It is upon the experience of these lines, reinforced by my knowledge of the traffic already developed within the area, that my estimates of revenue have been based for this tramway.

Compared, however, with any of these other tramways quoted, the suggested line to Queensferry excels them all in the population fixed and floating which will feed the line, in the natural and varied amenities of the landscape, and in the attractions at both termini, which are without compare anywhere in the kingdom, that is to say, the City of Edinburgh, and all that it means as a centre of attraction at one end; whilst at the other end is Queensferry, with its scope for pleasure-sailing—not yet developed—in the upper waters of the Firth, its Forth Bridge, and now the Base and its accompaniments, concerning which the interest and attraction to citizens and to visitors will not stale with time. These must bring good grist to the mill of that authority fortunate enough to own and to operate the tramway rights over a route so potential in public benefit.

It is those great engineering works of recent creation, with their attendant activities; added to the fine scenery *en route*, which give to this proposal, now revived, exceptional interest and value, to which the city of Edinburgh possesses the first and natural claim.

Although the remit makes no mention of other forms of transit than that of "tramway," I may be permitted to say that I have not excluded from my study of the subject both the possible economy and suitability of the motor-omnibus as a medium of public transport for this route. After much careful study of the comparative costs and the local necessities, I am unable to advise either its relative economy or its suitability for a service of the kind here required. It is not adapted to the necessities and conditions of the situation. My reasons for this conclusion I shall be pleased to give if desired. The motor-omnibus has its appropriate and economic place, but Edinburgh to Queensferry—with the peculiar needs and conditions of these destinations—is not its proper province, publicly considered. This is, in fact, pre-eminently a tramway route.

THE MOTOR-OMNIBUS AND TRAMCAR COMPARED.

Gentlemen,—I am asked to amplify the reference in my earlier report to the suitability of the motor-omnibus as a possible vehicle of public transit between Edinburgh and Queensferry as compared with a tramcar.

Fundamentally, the comparison may be stated and tested under the following heads, viz.:—

(1) *Accommodation.*—One motor-omnibus (single or double-decked), seats from 28 to 36 persons = average, 32; one tramcar (electrically propelled, single and double decked), seats from 48 to 72 persons = average, 60. The comparison of accommodation is therefore expressible as follows:—Motor-omnibus = 1; tramcar = 2.

(2) *Cost of Operation, Exclusive of Contribution to Capital.*—The cost of operating a motor-omnibus may be stated at from 8·5d. (pre-war), rising to 13·17d. and upwards to 16·81d. per omnibus-mile (current maximum rate) of 32 persons (average).

The cost of operating a tramcar (electrically propelled) may be stated at from 5·99d. to 11·44d. (current maximum rate) per car-mile, of 60 persons (average).

For comparison of the two systems in actual work, upon scales adequate to form a sound opinion, take the following two towns, operating their own electric tramway system, along with motor omnibuses as adjuncts, thus:—

	Cost per Omnibus Mile.		Number of Motor Omnibuses in Service.
	Year 1915-16.	Year 1916-17.	
Birmingham	=9·584d.	11·844d.	41 and 52 respectively.
Sheffield	=8·355d.	9·711d.	22
Average ...	=9·873d.		

	Per Tramcar Mile.		Number of Tramcars in Service.
Birmingham	=8·419d.	10·059d.	585
Sheffield	=7·333d.	8·340d.	349
Average ...	=8·54d.		

Applying the above two cases of Birmingham and Sheffield, which are the only two cities possessing in connection with their municipal tramways the auxiliary of such a substantial fleet of motor-omnibuses, we have the following comparison of operation as between the tramcar and the motor-omnibus respectively, thus:—

At Birmingham.—The motor-omnibus:—Operating costs (1916-1917) = 11·844d., or, say, 1s. per omnibus-mile. The tramcar:—Operating costs (1916-1917) = 10·059d., or, say, 10d. per car-mile.

At Sheffield.—The motor-omnibus:—Operating costs (1916-1917) = 9·711d., or, say, 9¾d. per omnibus-mile. The tramcar:—Operating costs (1916-1917) = 8·34d., or, say, 8⅜d. per car-mile.

From the foregoing it appears that at Birmingham the cost of operating a motor-omnibus (seat for seat) may be stated as 1·87 times that of a tramcar, or approximately twice; and at Sheffield the cost of operating a motor-omnibus (seat for seat) may be stated as 2·12 times that of a tramcar. The average working cost of tramways operation over 35 large towns of the United Kingdom is 7·82d. per car-mile.

(3) *So Much for Operation only. What of Capital Cost and the Annual Repayments towards Capital Redemption?*—This part of the cost must be worked out locally, i.e., with reference to the particular route under consideration—that is, the City to Queensferry—and added to the known costs of working, as elsewhere ascertained. I estimate this head of account upon the Queensferry route will add to the operating or working cost for a tramway = 4·5d. per car-mile. With a motor-omnibus service the contribution towards this head of account will add to the working or operating cost = 1·88d. per omnibus-mile.

The following comparison (reduced to the common standard of tramcar-mile and motor-omnibus-mile respectively) may now be given; and for this purpose the operating cost of tramcar is based upon the average of 35 towns of over 100,000 inhabitants (latest published returns):—

	Average Operating Cost per Mile.	Annual Contribution towards Capital per Mile of Car or Omnibus respectively.	Total Costs of Operation (including Capital).
TRAMCAR.		Estimated.	
Average of 35 Towns of over 100,000 inhabitants ...	7·82d.	3d.	10·82d.
Applied to the Queensferry route (as advised) ...	6·50d.	4·50d.	11·00d.
MOTOR-OMNIBUS.			
Average of latest two years' working	9·873d.* (actual)	1·88d.	11·753d.*

* To this rate of 11·753d. per omnibus-mile may be added a charge in respect of road maintenance, not at present ascertainable.

Thus, taking the two main heads of account, i.e., capital cost plus operating cost, we have the following comparison reduced to the common standard of total cost per mile of passenger.

Tramcar per mile for, say, 60 persons = 11·00d. = 0·183d. per passenger.

Motor-omnibus per mile for, say, 34 persons = 11·753d. = 0·346d. per passenger.

In other words, the gross cost (exclusive of road maintenance) may be expressed by the following formula:—

Tramcar equals 0·183d. per passenger per car-mile.

Motor-omnibus equals 0·346d. per passenger per omnibus mile. That is to say, the motor-omnibus is in the total of operating and of capital costs combined, approximately 89 per cent. more costly to carry on than the tramcar (seat for seat).

The foregoing facts applied to the Queensferry route and its own peculiar conditions (making due allowance for the variations of load and of passenger distribution) lead me to say that, in order to make a motor-omnibus service yield the same financial results as a tramway service, and providing the same travelling facilities (seat for seat) as the tramcar, the gross income of the motor-omnibus must be from 1·33 to 1·5 times that of the tramcar, being the equivalent of about £12,000 to £15,000 extra revenue per annum to that required for a tramway, and this can be got only by increasing the fare from sixpence to about ninepence per passenger for the single journey, if the same accommodation is to be offered to individual passengers by both services. But this high scale of fares would of itself prevent it from ever becoming a popular ride within the reach of the working classes and their families. The scheme would therefore lose much of its value as a health and pleasure factor; and it would remain a permanently inefficient and not popular service except to those who can afford to pay the much higher fare and endure the relative discomforts of a motor-omnibus as compared with a tramcar. In this form it could not be called a people's service, which is the function of a municipal tramway.

The present scale of fares by the service of motor-omnibuses is tenpence for single journey, as compared with my estimate of sixpence by the tramcar. Besides the loss and deprivation to the citizens by the higher fare suggested, there is, further, the loss accruing to local rates from the absence of any local assessment of a motor-omnibus undertaking except only for depots. Municipally considered, this is an important item in the financial comparison, and its importance will be appreciated when, for illustration, it is stated that the local rates (owners' and occupiers') upon the Edinburgh Cable Tramways amount to about £15,000* per annum. If, therefore, the tramway service were superseded by the motor-

* Current year, £17,000.

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omnibus, the rates would be poorer from this source by that amount annually, less the assessment value on depots.

On the general subject of motor-omnibus versus tramcar there are further points incidental to this comparison to be developed. They barely arise upon the Queensferry route.

But beyond that strictly financial side of the question are the other aspects of (*a*) convenience, (*b*) suitability, (*c*) exclusive rights, etc., whilst of importance to the Corporation is the problem of getting the necessary powers from Parliament for a motor-omnibus undertaking.

(*a*) *Convenience.*—If the motor-omnibus is a double-decker—that is, seated for 34 persons—the relative inconvenience and its inaccessibility (not to mention the reduced safety, and the swaying motion of the motor-omnibus as compared with a tramcar), are obvious, and need no exposition.

If the motor-omnibus is a single-decker seating only 28 to 30, then the disparity of cost is increased against, and is still more unfavourable to, the motor-omnibus, whilst the congestion of the motor-omnibus interior, and its disagreeable atmosphere as compared to a tramcar, are likewise acknowledged.

It must be remembered that, for the greater part of the year, only the enclosed type of omnibus would be suitable.

(*b*) *Suitability.*—As applied to such a route as Queensferry, with its sudden and probably frequent demands for the transport of bodies of men from the Fleet, and of civilian passengers during the holidays and the summer rush traffic, the only suitable public service vehicle for this route is the tramcar, with its much greater accommodation, its remarkable adaptability to such sudden demands, and its greatly reduced cost of operation (seat for seat).

(*c*) *Exclusive Rights.*—Assuming a municipal motor-omnibus service here as possible, it is most improbable that there could now be any exclusive rights granted to the Corporation in respect of this route. With a tramway, the possibility of any other body or authority acquiring concurrent powers from Parliament for tramway rights along the same route is, I believe, without precedent.

Concluding Observations.—The fact that a great service of motor-omnibuses operates through the City of London offers no analogy and provides no reason for anticipation of financial success on such a route as Edinburgh to Queensferry, except at the much increased fare, beyond that of a tramcar. Thoughtful reflection of the entirely dissimilar conditions of London and of Queensferry will readily suggest why the success presumably achieved in London is no criterion to success on the Queensferry route, but upon the contrary.

It is a fact that the profits of any tramway system depend in great part upon the revenue obtained from the comparatively few hours daily of peak-load. This, stated broadly, and applied to the Queensferry route, means that during these hours a tramcar (64 passengers) would, at the proposed rate of 6d. for the journey of 8 miles, be earning about 4s. per car-mile, while the total cost of operation would be, say, 1s. per car-mile, leaving a difference of 3s. per car-mile as surplus to help for the quiet hours; and a motor-omnibus (32 passengers) would be earning about 2s. per omnibus-mile, while the total cost of operation would be, say, 1s. per omnibus-mile, leaving a difference of only 1s. per omnibus-mile as surplus to help for the quiet hours.

Or, in other words, the tramcar, operating at less cost, is capable of earning a revenue twice that of the motor-omnibus, and a balance or surplus, after meeting all costs and expenses, of thrice that of the motor-omnibus, the rate or scale of fares being assumed as equal in both cases, and seat-for-seat in each case.

In conclusion, I repeat what I have before stated:—"The motor-omnibus has its appropriate and economic place, but Edinburgh to Queensferry—with the peculiar needs and conditions of these destinations—is not its proper province, publicly considered."

APPENDIX.

Since preparing the foregoing report, I have received from Birmingham and Sheffield the following summarised statement, which puts clearly the actual working comparison between the two systems of tramcar and of motor-omnibus respectively. Year under review, 1916-17:—

(1) BIRMINGHAM.—Average fare paid per passenger per tramcar mile = 0·6d., or three-fifths of a penny. Average fare paid per passenger per omnibus-mile = one penny.

(2) SHEFFIELD.—Average fare paid per passenger (by tramcar) = 0·876d., or seven-eighths of a penny. Average fare paid per passenger (by motor-omnibus) = 1·606d., or 1 3-5ths of a penny.

These figures of the most up-to-date records available, from two such cities as Birmingham and Sheffield, show that in the case of Birmingham the motor-omnibus requires an average fare per passenger of 66 per cent. higher than a tramcar, whilst in Sheffield the motor-omnibus requires an average fare per passenger of 83 per cent. higher than a tramcar.

The fare charged per mile in Sheffield makes the comparison still more significant:—Thus, with a tramcar the average fare charged per mile is only = 0·371d., or three-eighths of a penny, whilst with a motor-omnibus the average fare charged per mile is = 1·218d., or 1¼d.; being a difference per passenger of = 0·847d., or about seven-eighths of a penny per mile.

That is to say, the average fare charged on the motor-omnibus for like distances is 2¼ times higher than that charged for the tramcar.

NOTE. In considering these comparative results of the two systems, allowance should be made for the greater preponderance of tramcars over the number of motor-omnibuses.

EASTBOURNE, which is served solely by motor-omnibuses, supplies the following statistics of their operation, viz.:—

TOTAL COST PER OMNIBUS-MILE (including capital contribution).

Year = 1914-15, 12·02d., whereof for capital repayments = 1·69d.
,, = 1915-16, 12·61d., ,, ,, = 0·74d.
,, = 1916-17, 20·13d., ,, ,, = 3·32d.

These figures, quoted from Eastbourne, Sheffield, and Birmingham reports, more than confirm the conclusions stated in the foregoing memorandum as to the incomparable economy of the tramcar over the motor-omnibus, as a vehicle of transit for city and for suburban service such as that now under review in relation to Queensferry.

A JOINT REPORT UPON THE PROPOSED INSTALLATION OF TRAMWAYS BETWEEN THE CITY OF EDINBURGH AND SOUTH QUEENSFERRY.

By J. B. HAMILTON (*General Manager, Leeds City Tramways*)
and
E. P. FISHER (*General Manager, Dundee Corporation Tramways*).

In pursuance of communications received we have recently visited Edinburgh, and gone carefully over the proposed route. We are both extremely well acquainted with the topography of the district, and are fully cognisant of the traffic possibilities which exist or may be created as a result of the proposed form of transport. In connection with both cities to which we are officially attached schemes for the suburban extension of tramways have from time to time been dealt with, and it has been our duty to report upon all matters relating thereto. In several cases such extensions have been carried into effect with the most satisfactory results, both as to the travelling public and the financial returns. In addition, we have both been asked to advise in the case of other localities where the proposed scheme was analogous to that which is now under consideration.

The general policy of a Corporation to extend their transport facilities, when satisfied there is public necessity, from the city into surrounding districts, has received the full approval and commendation of Parliament in innumerable cases—in fact, we do not remember an instance in which the Corporation, being satisfied themselves as to the advantages of the proposal, and not being opposed on the preamble by the local authorities into whose area they proposed to extend their system, have been refused the necessary Parliamentary sanction. The promotion of such lines has very frequently been opposed by railway companies, generally on the ground of competition, but they have invariably been unsuccessful in sustaining their petitions.

In our view the present seems an exceptionally opportune time for such an application being made to Parliament. The high pressure at which everyone is working during the present national crisis will undoubtedly to some extent be relaxed when hostilities cease, and the opportunities which this line will afford of economical and frequent communication between the City of Edinburgh and the beautiful and interesting district around Queensferry will, if then constructed, be eagerly utilised by the residents in Edinburgh and the districts to be served, as well as their numerous visitors.

It is probable that for such reasons, and in view of developments which may ensue during the reconstruction period after the war, Parliament, which during 1915-16 had indicated a disinclination to consider private Bills unless of a most urgent nature, have considered and granted during the session of 1917 a permission to several local authorities to instal forms of transport, and have also dealt with other forms of local legislation. If the sanction is given by Parliament, it would be practically a year before construction would be commenced, and in any case nothing could be done until the consent of the Treasury had been received for the borrowing of the necessary capital.

Further delay would, in our view, be almost certain (having regard to the traffic possibilities) to encourage private enterprise to promote schemes for tramways upon this most favourable route. In our opinion it should be the settled policy of the city to control not only all the tramways within the boundaries, but also on such main arteries of travel as the Queensferry route. Such is the decision arrived at in practically every town and city within the Empire.

As the general features of the route must be known to all the members of the Tramways Committee, we need not further enumerate them, except to point out that there are practically no engineering difficulties whatever. Apart from questions of amenity, the Dean Bridge is even wider than in many cases in which tramways are now being successfully and safely operated. Again, the gradients of Hawes Brae are less severe than exist on many undertakings, and are well within a reasonable factor of safety.

We have duly considered the proposal to construct lines so as to enter or leave the city by Dean Bridge or Comely Bank, and recommend that both routes should be included in the application. We suggest that they are complementary to each other, and have definite traffic possibilities which justify them. The proposal to construct

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partly on the roadway and partly on adjacent private ground is an excellent and most desirable one, as it provides a guarantee for the lessening of the cost of installation and operation, and at the same time, by increasing the effective speed, adds a great attraction to the travelling public. We have gone over very carefully the estimates for construction prepared by the city engineer, and consider they are more than ample, notwithstanding the increased cost of materials and labour, to cover all costs of construction which it is reasonable to forecast.

The magnificent situation of the City of Edinburgh, with its historical associations and buildings, must at all times attract large numbers of visitors; in addition to that the world-famous Forth Bridge, the presence of large numbers of the units of our Fleet, which never fails to stir the public imagination and interest, and the beautiful and varied panorama of scenery between Edinburgh and South Queensferry, entitle the trained observer of tramway problems to assume that, in addition to the residents in the city and *en route* to Queensferry, there will be a very large influx of people from all parts of the kingdom.

We have gone very carefully into the figures of resident population supplied to us, and in addition have taken account to a justifiable extent of the transport possibilities, of members of our Fleet, and of visitors. From these figures, applied with the knowledge gained by a wide experience, we have prepared approximate estimates of revenue and working expenses, as well as sums required for the payment of interest and sinking fund, and in consequence beg to state, on financial grounds, that the Tramways Committee need have no hesitation in recommending to the Council the construction of this line, considered either as a portion of, or a separate entity from, the general system of tramways.

It will not only, in our view, be entirely self-supporting, but when in due course the whole system of tramways passes into the hands of the Corporation it will, in all similar circumstances, be a considerable augmentation to the tramway revenue. We are conversant with other occasional forms of road transport, such as motor-omnibuses, railless traction, and so on. Except by those who have never gone thoroughly or impartially into necessary details of relative costs, or fairly considered the elasticity of travelling accommodation which the larger, more reliable, more sanitary and comfortable tramway-car provides, as compared to a motor-omnibus, there can be no case seriously put forward of challenging the decision of the responsible authority to instal the well-tried and proven form of traction by overhead electric tramways, which we unhesitatingly recommend to be adopted as best suited for the traffic requirements we anticipate will be experienced between Edinburgh and South Queensferry.

FINANCIAL REPORTS AND MEETINGS.

United Electric Tramways of Caracas, Limited.—A dividend of 7 per cent., less income-tax, for the last financial year has been declared.

John Brown and Company, of Sheffield, have declared an interim dividend at the rate of 5 per cent. on the ordinary shares, less income-tax.

British Electric Traction Company.—The board announce a dividend at the rate of 6 per cent. per annum on the preference stock for the half-year ended September 30.

The Electric Construction Company have declared a dividend at the rate of 6 per cent. per annum on the ordinary shares, less income-tax, for the year ended March 31, 1917.

Cape Electric Tramways.—After providing the debenture interest and redemption, there is a net credit balance of £39,152, as compared with £23,680 for the previous twelve months. The amount carried to reserve has been increased from £5,000 to £12,000, and the ordinary dividend has been raised from 3½ to 5 per cent., and £2,597 is carried forward. During the year the tramways carried 23,752,016 passengers, earning £231,105, as against 22,477,366 passengers, earning £212,791, in 1915-16. A satisfactory increase on the preceding year is shown both as regards the Cape Town and Port Elizabeth systems, which is attributable to the number of troops from Australia and New Zealand who have passed through Cape Town and to the general prosperity throughout South Africa.

Record Year at Ayr.—Mr. W. Grant, general manager of the Corporation Tramways, reports that for the year ended May 15 last the total revenue amounted to £21,074, compared with £19,285, showing an increase of £1,789. The traffic receipts alone constitute a record, amounting to £19,756, against £18,377, an increase of £1,379. The receipts per car-mile work out at 11·79d., as against 9·62d. The number of passengers was 4,596,906, compared with 4,352,113, an increase of 244,793. The number of miles run was 428,739, as against 457,503, a decrease of 28,764. This is accounted for by the fact that the winter service was continued throughout the summer, only occasional extra cars being run as required. The working expenses, exclusive of power charges, amount to £9,609, or 5·37d. per car-mile, and, including power costs, the total working expenses for the year amount to £12,842, or 7·18 per car-mile. This shows a percentage of working expenses to receipts of 60 per cent., The charge for energy supplied to the tramways was increased by 10 per cent., making a total increase of 25 per cent. since 1915.

Norwich Tramways Company.—The annual report, presented at the shareholders' meeting, showed receipts totalling £43,712 17s., increase £880 2s. 6d., and expenditure £30,827 9s., increase £1,318 16s., making net profit £12,885 8s., decrease £438 13s. To the sum of £12,885 8s. must be added £428 10s. brought forward, making a total of £13,313 18s. to be dealt with as follows:—£8,000 reserve fund, £5,280 to payment of 2 per cent. dividend on the shares for the year ended June 30, and £33 18s. to be carried forward. The number of car-miles run was 963,484, against 932,934, passengers 10,767,626 (10,405,881), earnings per mile 11·61d. (11·02d.), expenses per car-mile 7·49d. (6·91d.), earnings per passenger 0·97d. (0·99d.). In moving the adoption of the report, Mr. F. Fitzgerald (who presided) stated that after paying a dividend of 3 per cent. for five years, the directors were obliged to propose to return to 2 per cent., as a serious necessity had arisen of adding to the reserve in view of the reconstruction work that must be undertaken as soon as circumstances permitted. The general rate of fares in operation was less than that authorised, and in view of the strain on the company's resources it was felt that this was the proper time to place all passengers on an equal footing, with the exception of scholars.

Newcastle Tramways Successful Year.—The annual report of the engineer and general manager (Mr. Ernest Hatton) of the Newcastle Corporation Tramways and Electricity Department for the year ended March 31, 1917, shows that the traffic revenue for the year was £346,334, as compared with £314,732 for the previous year, while the total revenue amounted to £356,534, as compared with £324,694. Working expenses aggregated £208,299, the balance of profit being £148,235. Adding interest on investments, £6,383, there is a total of £154,619, as compared with £135,764 in the previous year. After payment of interest, sinking fund, and other charges, there is a balance of £62,902, as compared with £44,858. It is proposed to appropriate the balance as follows:—Income-tax, £15,845; contribution in aid of rates, £7,000; insurance reserve, £2,065; and renewals fund, £37,992. The passengers carried numbered 78,189,246, an increase of 5,437,615 over 1915-16, and over 13 millions above that of 1914-15. Traffic expenses are £24,000 higher than in 1914-15. The only reduction in expenditure is that for local rates, which followed the extended negotiations and litigation with the Poor Law authorities, and resulted in an approximate reduction of £8,000. The City Council have decided to make a contribution to the rates from the tramway revenue of £7,000. The tramway manager refers to the growing demand for increased services of cars for workmen, and says that while every effort has been made to cope with this demand, in view of the limitations placed on the system by the Government departments, it is impossible to do much more. As showing the efforts that have been made to meet the requirements of the workpeople, it is stated that 380 car loads, averaging 100 passengers per car, have been dealt with daily.

Auckland Electric Tramways.—Presiding at the meeting of the Auckland Electric Tramways Company, Limited, on November 20, Mr. C. G. Tegetmeier, the chairman, said that the main features of the year ended June 30 last were the substantial increase in receipts, and the almost equal increase in working expenses. The traffic receipts amounted to £282,697, which was £7,914 more than in the preceding year, and was the highest amount yet taken. There was a corresponding increase in the number of passengers carried, which reached a total of 43,351,000, or nearly 1,000,000 more than in the preceding year. Fortunately the increase of £15,000 in traffic receipts during the past two years had been sufficient to make up for the increase in expenses. They might anticipate with confidence a further development of traffic. Considerable difficulties had been met with in regard to the supply of materials and the shortage of suitable labour. During the year 34 of their employees had left for military service, making a total of 121 since the beginning of the war. The strike of coal miners in New Zealand in April last affected the supply of fuel and interfered with their services, but the total car-mileage showed a slight increase. Under the New Zealand laws the income-tax is leviable on the companies and not on the individual shareholders in the company. As a consequence the whole of the profits are subject to income-tax on a higher scale. As the company are serving a public need, and with statutory limitations upon the price they can demand from the public for their services, the New Zealand laws press upon their shareholders somewhat unfairly. In New Zealand a similar enterprise, if carried out by a municipality, would be entirely exempt from taxation. During the year they had, at the request of the City Council, constructed a line about half a mile in length connecting different parts of the system in the centre of the city. It had been an expensive line to construct, but it would facilitate the handling of the traffic. The net result of the year's working was that after providing for all revenue charges, and setting aside £25,000 for renewals and depreciation, they had a net profit of £55,317, or £746 more than in the preceding year. They proposed to make the same allocation as in the preceding year, namely, £10,000 to reserve and £35,625 in payment of a dividend of 1s. 7d. per share for the year on the ordinary shares. The reserves which had been established and added to on this occasion, including the carry-forward, amounted to £203,518, which was more than 20 per cent. of the total paid-up share and debenture capital.

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PERSONAL.

Councillor W. Evans, J.P., the new mayor of Newport, has been a member of the Tramways Committee.

Mr. Harrison Barrow has been re-elected chairman of the Birmingham Corporation Tramways Committee for the eleventh time.

Mr. E. J. Elford, borough engineer of Southend-on-Sea, has been appointed city engineer of Cardiff, at a salary of £1,000 per annum.

The Right Hon. Lord Carmichael, G.C.I.E., K.C.M.G., has accepted a seat on the board of the British Thomson-Houston Company, Limited.

Mr. H. Faraday Proctor on November 9 completed the twenty-fifth year of his service as engineer and general manager of the Bristol Corporation electricity department.

Mr. A. R. Fearnley, general manager of Sheffield Corporation tramways and motor department, whose present salary is £1,000, has been granted two annual increments of £100 each.

Mr. W. H. Stradling has been appointed assistant manager of the Bristol Tramways and Carriage Company, Limited, in the continued absence on active service of Lieut.-Colonel S. E. Smith.

Mr. H. R. F. Mackay, city electrical engineer of Sydney, is visiting the United States and Canada, and in the course of his visits will inspect the principal electric supply undertakings in America.

Mr. C. H. Wordingham, president of the Institution of Electrical Engineers, has accepted office as one of the vice-presidents of the British Electrical and Allied Manufacturers' Association (Incorporated).

Alderman R. A. Smithson has been re-elected chairman of the Leeds Corporation Tramways Committee. With a brief intermission, Alderman Smithson has been chairman of the committee since 1898.

Lieut. E. Evans, R.G.A., has been appointed road transport officer under the Ministry of Food for South Wales and Monmouth. His duties are to carry out a scheme for the saving of both mechanical and horse transport.

Mr. W. A. Toppin has been appointed assistant electrical engineer at Chesterfield Corporation electricity works at a commencing salary of £250. Mr. Toppin has been testing and commercial assistant at Greenock.

Mr. E. L. Morgan has regretfully declined the position of city engineer of Cardiff, to which he was recently appointed. This decision has been taken owing to advice that the climate would be unfavourable to his wife's health.

Mr. C. W. Mallins, general manager of Liverpool Corporation Tramways, has, we regret to learn, sustained an injury to his knee by falling on the pavement owing to the lack of light. The injury is not serious, and he has been able to attend at his office.

Mr. W. Craufurd and **Mr. E. T. Holt,** engineering assistants in the tramways department of the London County Council, have been appointed assistant permanent way engineers at a commencing salary of £325, increasing by £25 annually to £400 a year.

Mr. Stanley Saunders, chief clerk in the electricity department at Lincoln, is taking up a similar post at Salford. Mr. Stanley Clegg, electrical engineer, on behalf of the staff of the electricity and tramways department, has presented him with a watch.

Mr. R. J. West has been appointed to fill the vacancy on the board of Norwich Tramways Company caused by the death of the Hon. A. G. Brand, whose loss was reported with regret by the directors at the annual meeting. **Mr. F. Fitzgerald** was re-elected chairman.

Mr. J. E. Dobson, late Scottish representative of Bruce Pebbles and Company, Limited, Edinburgh, has been appointed London office manager to the company in place of the late Mr. R. W. Gauntlett, and has taken up his new duties at Hastings House, Norfolk Street, Strand.

Lieutenant H. M. Dawson, on resigning his membership of Bingley Urban Council because of his election to Bradford Corporation, was referred to as "a man who did things," in proof of which statement the great part he took in bringing the Bradford Tramways to Bingley was mentioned.

Mr. Hy. Clayton has been appointed assistant engineer and manager of the Preston Corporation Tramways at a salary of £200. He has been in the employment of the Corporation for about twelve years, and, it was stated, had proved himself to be an excellent officer and a good all-round engineer.

Alderman Russell Taylor has been re-elected chairman of Liverpool Tramways Committee, and **Alderman Fred Smith** deputy chairman. In returning thanks, the chairman referred to the want of consideration shown by passengers towards the women conductors, who were doing their work wonderfully well.

Mr. Fred Bland, of Edgar Allen and Company, Limited, Sheffield, on November 10 gave an illustrated lecture on "Thirty Years' Tramway Practice" to the members of the Rotherham Technical Institute Engineering Society. He described the process of manufacture of a tramway point and the evolution of points and crossings.

Mr. Chalmers Kearney will lecture on "High Speed Railways After the War" before the Society of Engineers on Monday, December 17, at 5 p.m., at the Geological Institute, Burlington House, Piccadilly, W. Tickets may be obtained on application to the Secretary, Society of Engineers, 17, Victoria Street, London, S.W.1.

Sir John Courtis, chairman of Cardiff Tramways Committee and Development Committee, is interested in a new industry which is about to be started in that city. According to an announcement at the Lord Mayor's election, the industry will be of a new character, and will involve the employment of many women and also operatives in subsidiary trades.

Mr. John C. Mitchell, F.C.I.S., was appointed at the meeting of the Lambeth Borough Council held on Thursday, November 22, as the Council's representative on the Metropolitan Water Board. Councillor Mitchell is treasurer of the Underground Electric Railways Company of London, Limited, and allied companies, and has recently served as president of the Chartered Institute of Secretaries.

Mr. R. H. Dickinson, chief engineer of the Birmingham Corporation Tramways, has received official intimation that his eldest son, the Rev. H. Dickinson, vicar of St. Stephen's, Birmingham, was killed in action on October 30, while acting as chaplain to the Artists Rifles. Imbued with a strong sense of devotion to duty, he volunteered for service at the front, and was appointed chaplain to the General Headquarters.

Mr. F. W. Ketley, manager and engineer of Norwich Tramways Company, was warmly praised by Mr. F. Fitzgerald, who presided at the annual meeting. The chairman's remarks were supported by the Lord Mayor of Norwich, who said that Mr. Ketley performed his duties admirably, and had ingratiated himself with the citizens by his readiness to help in any work. The staff and employees were also commended by the chairman.

Mr. T. R. Whitehead, engineer and manager of Coventry Corporation Tramways, has been granted an increase of salary from £600 to £700 per annum. Councillor Wale, chairman of the Tramways Committee, in recommending the increase to the Council, said that it was the unanimous recommendation of the members of the committee, and alluded to the able services rendered by Mr. Whitehead in times of great difficulty.

Mr. Arthur Brown, city engineer of Nottingham, on November 21 completed fifty years' association with the Corporation. *The Nottingham Guardian*, in an appreciative notice of Mr. Brown's services, says that he has had a potent influence in the development of the city. To mark the completion of his fifty years' work, the staff and employees of the engineering department have presented him with an address and a beautiful silver inkstand.

Councillor George New, J.P., chairman of Sunderland Tramways Committee, has been appointed an alderman. Like the late Councillor T. Summerbell, M.P., whom he succeeded in the chairmanship eleven years ago, he is a member of the Labour Party. He has served on the Education, Watch, Health, Lighting, and other Committees, but his principal work (says the *Sunderland Daily Echo*) has been in connection with the tramways. He took a prominent part in the propaganda which resulted in the decision to municipalise the service, and when the Tramways Committee was formed he was elected a member. It is acknowledged by all who are conversant with the work he has done as chairman that he has been eminently successful.

Mr. J. B. Hamilton, general manager of the Leeds City Tramways, reported to the committee on November 20 that he had been nominated by the Municipal Tramways Association to join the committee which is being set up by the Board of Trade to co-ordinate supplies, and thus economise the services of the tramways of the country. He was given a free hand in regard to the acceptance of the position. For some time past Mr. Hamilton has filled a responsible post at the Admiralty in connection with the arrangement of labour difficulties, a work which is now on a well-organised basis. It is understood that the acceptance of the new post will involve his retirement from Admiralty work. Mr. Hamilton was recently appointed chairman of the Executive Council of the Municipal Tramways Association for the ensuing year. The appointment has been made under the new clause in the articles of association adopted at the conference at Blackpool, which enables the executive to appoint a chairman to preside at all meetings at which he may be present.

The death occurred on November 4 of **Mr. William Du Bois Duddell,** of 56, Victoria Street, Westminster. Mr. Duddell, who was only 45 years of age, was president of the Institution of Electrical Engineers in 1913. He has recently been a member of the Admiralty Board of Invention and Research, and also of the Inventions Board of the Ministry of Munitions. In August last he was appointed a Commander of the Order of the British Empire.

London Underground Traffic Facilities.—Mr. Wardle, replying to a question by Major Newman in the House of Commons on November 28, said he understood that the services on the London underground railways had not been reduced, but on the contrary had been substantially increased during the war. He regretted that it was not possible at the moment to increase the supply of petrol for omnibuses.

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TRAMWAY AND LIGHT RAILWAY NOTES.

AYR.

EMPLOYMENT OF WOMEN DRIVERS.

The annual report of the manager of Ayr Corporation Tramways states that the number of accidents was 22, as compared with 16 the previous year. This is very gratifying in view of the lighting restrictions, and that the majority of the drivers were females. These were factors calculated to increase the risks of accidents, but none of the accidents could be attributed to either cause. The female drivers have done extremely well, and upon three occasions have averted accidents by their coolness and promptitude. The consumption of electrical energy showed a decrease of 3,816 units, but in view of the decrease of 28,764 in the number of car miles the consumption should have been considerably lower. The upward tendency can only be accounted for by the introduction of the female drivers, the necessary training required, and the first complete year's working of the top covered cars. The consumption was equal to 1·08 units per car mile, as against 1·02 for the previous year.

BARROW-IN-FURNESS.

DANGER FROM LOOSE TROLLEY ROPE.

A ten-year-old girl standing on the top of a Barrow-in-Furness car was struck by the trolley rope, which swung round and caught about her neck, lifting her off the car. She fell into the roadway and was badly bruised.

BIRMINGHAM.

NO CHRISTMAS TRAFFIC.

In view of the war conditions, and after considering a letter from the Amalgamated Society of Tramway and Vehicle Workers, the Birmingham Tramways Committee have decided that no tramcars or omnibuses shall be run on Christmas Day.

BURNLEY.

LATE CAR FOR SOLDIERS ON LEAVE.

By arrangement between Burnley, Colne, and Nelson Councils, a tramcar now conveys soldiers to the Colne and Nelson districts who arrive by the last train at Burnley at 11.23 p.m.; civilians are also carried. The car starts from the centre of Burnley, and waits opposite the station until the train arrives, no matter how late it is. Mr. Henry Mozley, the general manager, has made arrangements with the station authorities to let soldiers know what course to take in order to catch the car.

DUNDEE.

PROPOSED SALE OF RAILLESS CARS.

The deputy chairman of Halifax Tramways Committee, the traffic manager, and the tramways engineer, have been authorised to visit Dundee to inspect two railless trolley cars which the committee propose to purchase. Dundee Tramways Committee discontinued the railless trolley service some years ago, in consequence of the Corporation refusing to sanction a scheme for resurfacing the roadway used by the cars.

EDINBURGH.

EDINBURGH-QUEENSFERRY TRAMWAY PROJECT.

At the next meeting of Edinburgh Corporation the Tramways Committee will be asked to open negotiations with the owners of land on the route of the proposed tramway to South Queensferry to ascertain on what terms they would supply the land required for the track to be laid or for any roads that might be required, and also to negotiate with the county authorities in regard to roads and bridges on the route, and to report to the Council not later than the first meeting in January.

GLASGOW.

WOMEN'S WAGES—DAMAGES AWARDED A PASSENGER.

In submitting to Glasgow Tramways Committee the award of the arbitrator on applications for increased pay, the Town Clerk stated that the pre-war remuneration of men had been increased by 15s. per week (7s. wages and 8s. war bonus), the various grades receiving increases varying from 2s. to 7s. Female employees would receive no advance, as they had already 8s. per week more in the tramway service than they would have in a munition factory. The arbiter was of opinion that the principle to be applied to female workers was that expressed in the orders of the Minister of Munitions.—In an action against Glasgow Corporation for £250 damages in respect of personal injuries sustained by Mrs. Mitchell, it was stated that when she was about to alight from a tramcar at a stopping place, the car suddenly started, and she was thrown down. The defence was that pursuer was injured as the result of leaving the car while it was in motion. Lord Ormidale granted decree for £80 and expenses.

HULL.

ADVANCE IN WAGES—CRITICAL POSITION AS REGARDS POWER PLANT.

Hull Tramways Committee have granted an additional bonus of 5s. 6d., bringing their increase up to 12s. The advance to women is 3s., making their total bonus 7s. These increases involve a yearly expenditure of £7,500, and the chairman has stated that it will bring the undertaking to the border line of profit and loss.—The city engineer reported to the Tramways Committee on November 28 that the tramway's power plant required repairs and renewals, and that any failure in the supply within the next few days would involve a reduction of the service. To his surprise the Ministry of Munitions had refused to sanction the supply of a spare armature, which Siemens Brothers had offered at £1,310. On the suggestion of Councillor Raine, deputy chairman, the committee decided to meet specially to consider the situation, including the question of obtaining part of the supply of energy from the Electricity Committee. For some time a scheme for combining the two power stations has been under consideration, owing to the age of the tramway station and the need for modernising it.

LEEDS.

CONDUCTORS' UNIFORMS.

Leeds Tramways Committee have forbidden the wearing of regimental badges on the caps of conductors. The caps already bear the city coat of arms, and it appears that women conductors have adopted the custom of pinning various regimental badges on the caps. The practice had become so frequent that the committee found it desirable to pass the rule forbidding it.

LONDON.

APPOINTMENT OF ASSISTANT PERMANENT WAY ENGINEERS—CAR LIGHTING—INCONVENIENCE OF DEAD ENDS.

On February 20, 1917, the Council decided that in the reorganisation of the tramways department, the salary to be assigned to each of the two positions of assistant permanent way engineer should be £300 a year, increasing by annual increments of £25 to £400. Mr. W. Craufurd and Mr. E. T. Holt, assistants in the first class, have acted as assistant permanent way engineers since 1906, and they now receive £300 a year. The Highways Committee reported that they were well suited for the positions with the designation of assistant permanent way engineer, and the Council appointed them to these positions.—The lamps in the upper decks of tramcars in London have now been partly painted over, after having been entirely unobscured during the greater part of this year. The obscuration, however, is not so drastic as was formerly the case. This year, when notifications of raids have been received, the cars have run in total darkness save for the two headlights and the rear red light.—The disorderly scenes that take place at the terminus of the London County Council tramways at Victoria are causing complaint. It has been suggested that much of the trouble would be avoided if the dead end were converted into a loop, and it was stated at a meeting of the London County Council that a scheme for this purpose was being considered.

MANCHESTER.

REDUCTION IN LENGTH OF PENNY FARE.

The Manchester Tramways Committee recently decided to recommend the Council to shorten the penny stages on the various routes by 620 yards, with the object of enabling the committee to provide £100,000 in relief of the city rates. Originally the committee proposed that their contribution should be £50,000 for the year, but the Council insisted that the former contribution should be maintained. The recommendation was accepted by the Council on December 5.

MORECAMBE.

CONVERSION AND EXTENSION.

Alderman William Wright, in returning thanks for his election as mayor, mentioned that one of the necessary improvements was the adoption of mechanical traction on the tramways, which it was desirable should be extended beyond the borough boundaries.

NEWPORT.

THE TRAMWAYS EXTENDED TO THE DOCKS.

At the end of November Mr. Nicholls Moore, borough electrical and permanent way engineer, completed the extension of the tramways to the docks, where new works have recently been erected. The extension of the tramways became imperative because of the large number of workpeople employed at a factory, which is of a special character. For that reason facilities were afforded for obtaining the Light Railway Order and for securing the necessary tramway materials and labour, although prior to the war railway opposition had prevented the extension being made. About one hundred men were employed on the work of construction. The lines cross the railway at the Great Western and Tredegar level crossings. The additional labour supply has been taken advantage of to effect reconstruction and repair of the tramways at one or two places, so far as the supply of materials allowed. The double-deck cars purchased from the London County Council have been refitted for running on the new line from Clarence Place to the docks.

OLDHAM.

COMPLAINTS AGAINST EMPLOYEES.

Replying to allegations against drivers and conductors, the employees' union at Oldham has informed Oldham Tramways Committee that they think such complaints should be made to the union officials in the first instance. Regarding a case in which a driver is alleged to have left his car after being spoken to for failing to stop, they, in effect, refuse to believe that such incident occurred. The chairman (Councillor Cheetham) said he got letters of complaint every week. A driver recently was seen to ignore not only a compulsory stop, but a clocking station. When spoken to he left the car. The manager intimated that the driver was instantly

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dismissed, and the committee decided to forward particulars to the association.

PAISLEY.

TRAMWAYS WAR SERVICE.

The work of the Paisley Tramways Company in providing transport for munition workers has received recognition not only from military tribunals, but from the Ministry of Munitions. Mr. F. Coutts, the general manager, and his staff, have made every endeavour to provide the fullest possible service. For four hours in the morning, starting from 4.30, cars are run exclusively for persons engaged in munition works and controlled establishments, and several hours are devoted to the same workers in the afternoon and evening. At least 70 per cent. of the passengers carried daily are munition workers.

PORTSMOUTH.

LOADING PLATFORMS FOR PASSENGERS.

An improvement that will add to the efficient working of the Cosham Junction route of Portsmouth Corporation Tramways, and to the convenience and comfort of passengers, will shortly be carried out. Land is to be acquired with a frontage to London Road of approximately 252 feet, and a depth adjoining the railway of 190 feet, upon which side lines will be constructed to avoid congestion of traffic, and at the same time facilitate the loading and unloading of the cars. A sum of £800 has been paid for the land. Councillor J. Timpson, chairman of the Tramways Committee, at a recent meeting of the Corporation, stated that it was proposed to construct a circular line for the cars to run in on, and there would be platforms on a level with the steps of the cars. Passengers will alight on one side, and the cars will then run round and pick up on the other side. A covered gangway will connect the platforms with the public footpath.

SOUTH SHIELDS.

DAMAGES AGAINST CORPORATION.

On November 9, a Newcastle Assize jury awarded £600 to a wagoner who brought an action against South Shields Corporation for damages for personal injuries, alleged to have been caused through the negligence of a tramcar driver. Plaintiff, it was stated, was going down Station Bank with a four-wheeled wagon. He was walking on the pavement holding the reins to steady the horse, when a car coming behind ran into him. He was pulled underneath the wagon and injured. The Corporation had paid £150 into Court, and applied for a stay of execution, having regard to the amount of damages. The Judge, in granting the application, remarked that by doing so he did not wish to encourage the Corporation in an appeal.

WEST HARTLEPOOL.

AIR RAID PRECAUTIONS.

The Tramways Committee have decided, owing to mechanical reasons, that when the first air raid warning is given the cars shall be ordered back to the depots.

WALTHAMSTOW.

PRAISE FOR WOMEN TRAMWAY EMPLOYEES.

Mr. W. Murray, manager of Walthamstow Council tramways, at a meeting in aid of the Prisoners of War Fund, said that if they wanted a thing well done, they should set women to do it. After three years' experience, if had been proved that after a little training some women could be found who could do almost any work on the tramcars that men had formerly done.

YARMOUTH.

REJECTION OF A PROPOSAL TO ABANDON TRAMWAY SERVICE.

Owing to the necessity of repairing the tramways between the Hall Plain and the fishing village of Caistor, Yarmouth Corporation have discussed the question of closing down the whole undertaking until after the war. The General Purposes Committee reported against the suggestion by eleven votes to three, and recommended the repair of the Caistor section. The surveyor stated that the rails had ten years further life, the foundation being in perfect condition; but the rails needed repacking, three turnouts required to be removed and a number of joints welded. Rails were in stock to make good any found broken. To carry out the work with the present poor labour supply it would be necessary to close the line for three months. The Ministry of Munitions would not permit more than £500 to be spent, but the surveyor believed that the work could be done practically for that amount. During the discussion Councillor Middleton remarked that the surveyor's estimate was £1,200. The general manager reported that on the Caistor section the cars had rolled and oscillated since 1913, which was due to the rails being out of line at various places. The roll and oscillation could be minimised by reducing speed, which had been ordered. For the whole of the undertaking there were 18 cars in running order and 17 were waiting for spare parts, which he hoped would be obtained soon. He had been using parts from the laid-up cars to keep the others running. On the question of closing the whole undertaking, Councillor Knights asked how the electricity works would maintain their position without the £3,000 a year received from the tramways? As to the tramway deficit during the war, the borough accountant informed the Council that it was met by the town's share of the Government grant to the East Coast. The surveyor's report was adopted, and it was stated that that official hoped to execute the work without closing the line.

CONTRACTS AND ORDERS.

The Dewhurst Engineering Company have received an order from Sunderland Corporation for steel tubes for the electricity department.

Sydney Municipal Council have accepted the tender of Messrs. W. Adams and Company at £6,182 for the supply of boosting plant for Castlereagh Street sub-station.

Crompton and Company, Limited, have received an order from Grimsby Corporation for a motor generator and switchgear for charging accumulators on electric vehicles.

Electric Vehicles for Hampstead.—Hampstead Borough Council have purchased two electric motor vehicles fitted with Edison batteries for the use of the medical officer of health's department. The chassis have special van bodies.

Sheffield Corporation have accepted the following tenders in connection with the emergency power-house at Blackburn Meadows:—Buildings, John Greenwood; structural steelwork, Gilbert Heathcote and Company; electric capstans, Clarke, Chapman and Company, Limited; boosting sets, Crompton and Company, Limited.

Huddersfield Town Council have contracted with the Woods-Gilbert (British) Rail Grinding and Milling Company, Limited, Strand, London, W.C., for the grinding and milling of some sections of the track which are badly in need of repair. It is anticipated that the use of the Woods-Gilbert system will prolong the life of the rails from five to seven years.

L.C.C. Stores and Contracts.—The current contracts for the supply of general stores, with a few exceptions, will expire on December 31, 1917, and the Stores and Contracts Committee recently reported that they were taking steps to obtain supplies during 1918. This group of contracts, which ordinarily comprises 45 schedules, is the largest of the several groups dealt with each year, and includes such goods as metals, electric cables, lamps, fittings and materials, chemical and scientific goods, rubber and asbestos goods, leather, oilman's sundries, petrol, etc. It is proposed to continue the practice of buying certain classes of goods at current market prices or until special quotations under trade conditions again become normal, or the time is more favourable for new contracts to be entered into. In other cases new forms of tender and schedules are being prepared. As the number of tenders would probably be comparatively large, the committee thought it desirable, as in previous years, for the tenders to be opened by them instead of in the Council, and this was agreed to.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

APPLICATIONS FOR LETTERS PATENT.

Gas containers for motor vehicles (16,242)—R. Ames and W. F. Brown.

Air-brake apparatus (16,215 and 16,216)—Automatic Straight Air-Brake Company and W. Cross.

Apparatus for storing gas for use as fuel on motor vehicles (16,415)—J. F. Boyer, B. W. Hollis, and P. G. G. Moon.

Means for ventilating railway carriages and tramcars (16,220)—E. Dann and G. Farrow.

Motor cars driven by gas (16,541)—H. H. Gregory.

Railway switches (16,180)—P. Hansen and A. J. Joest.

Means for automatically regulating supply of gas to motor vehicle engines (16,306)—F. W. Hudlass.

Petrol or gas-driven vehicles (16,345)—E. F. Johnson.

Clutch and change-gear mechanism for motor vehicles (16,527)—F. W. Lanchester.

"The most comprehensive and illuminating work on the subject we have seen."
The Daily Telegraph.

DEPRECIATION & WASTING ASSETS

AND THEIR TREATMENT IN COMPUTING ANNUAL PROFIT AND LOSS

By P. D. LEAKE

Fellow of the Institute of Chartered Accountants in England and Wales, Fellow of the Institute of Bankers, Fellow of the Royal Statistical Society.

Particular attention is directed to a chapter on Depreciation and Controlled Establishments under the Munitions of War Act, 1915; and it may be added that the views of the Ministry of Munitions as to the proper treatment of Depreciation of Plant coincide with the views advocated in this work.

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Railway signalling systems (16,263, 16,264, 16,426)—McKenzie, Holland and Westinghouse Power Signal Company (*Union Switch and Signal Company*).
Fish-plates for switch tongues on railways (16,308)—A. V. Naylor.
Motor vehicles (16,356)—H. Newton.
Self-propelled vehicles (16,118)—W. Osborne & Co.
Petrol motors (16,291)—W. G. Ritchie.
High-pressure gas systems for motor vehicles (16,401)—G. H. Robinson.
Universal drive for motor vehicle wheels (16,430)—O. H. Rogers.
Flexible coal-gas containers for motor vehicles (16,227)—G. Spencer.
Rails for trams, trains, etc. (16,783)—T. J. R. Clarkson.
Life-saving device for road vehicles (16,577)—A. F. Fretwell.
Coupler for connecting trailers carrying gas-bags to motor vehicles (16,574)—H. H. Gregory.
Metal sleepers for rails (16,813)—J. T. John.
Rail fastening device (17,148)—J. P. Bergeron.
Long-arm for overhead system of electric tramcars (17,374)—M. Crumack and A. Senior.
Springing of road or rail vehicles (17,027)—F. W. Lanchester.
Construction and equipment of tramcars (17,257)—W. S. Laurie.
Appliance for use on tramcars for checking delivery of tickets (17,269)—F. L. MacLaren.
Railways (17,106)—H. O. Short.
Spring coupling device for motor traction (17,308)—G. W. Watson.
Train signalling and control systems (17,344)—C. H. Woodward.
System of lubrication for motor vehicle road springs (17,337)—F. Wright and J. Wright.

Specifications Published.

1916.

Motor road vehicles (14,502—*110,190*)—O. Tilley and B. L. Wilson.
Brakes on electric tramcars (16,749—*110,231*)—R. H. Wilkinson and W. H. Turner.
Points and switches (15,690—*110,420*)—A. Morgan.
Motor road vehicles (18,382—*110,451*)—E. Dobson.
Trolley heads for electric tramcars (15,365—*110,612*)—C. Svombo.

1917.

Apparatus for the heat treatment of railway and tramway rails *in situ* (145—*110,253*)—C. P. Sandberg.
Non-skid devices for motor vehicles (1,173—*110,261*)—G. Gunther and W. P. Miller.
Lifting jacks for motor road vehicles (7,849—*110,517*)—F. L. Rapson.
Vehicles for street railways (10,640—*110,529*)—A. A. Kinney.
Car truck (1,750—*110,681*)—G. K. Thompson.

MEN WANTED BY COLCHESTER TRAMWAYS.

THE COLCHESTER CORPORATION TRAMWAYS are in want of the undermentioned men, who must be either medically unfit for army service or over age. Application must be made by letter in the first instance. State experience and wages required. Any engagement will be for the duration of the war.

One shed foreman; one inspector; one general car fitter; one overhead linesman. R. C. BULLOUGH, Manager.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1916. WEEKS ENDED. Nov. 4.	Nov. 11.	Nov. 18.	Nov. 25.	1917. WEEKS ENDED. Nov. 3.	Nov. 10.	Nov. 17.	Nov. 24.	AGGREGATE. Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	53.120	52,460	53.617	52.241	56,328	55,395	54,485	54,384	47	2,438,833	+ 36,852
Calcutta ... ... Rs.	68.695	67.534	73.680	73.379	57,465	65.348	65,637	68,640	47	3,195,377	+ 612
Madras	(2 weeks) 31,596	(2 weeks)	29,664		(2 weeks) 35,433	(2 weeks)	33,914		47	765,562	+ 70,392
Pernambuco	3.453	3.504	3.555	3,400	4.313	4.333	4.279	4.333	46	180,428	+ 35,981

Companies Issuing Monthly Statements.

	1916. June.	July.	August.	Sept.	October.	Nov.	1917. June.	July.	August.	Sept.	October.	Nov.	Wks.	AGGREGATE. 1917.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ..	2.794	2.704	2.791	2.850	3.390	...	2.849	2.595	2.693	2.816	3.560	...	28	22.113	+ 3
Brazilian Traction Mlrs	7178000	7429000	7405000	7138000	...	...	7642000	7795000	8064000	7925000	...	...	39	68,430.000	+5,279.000
Brisbane	31.390	32.880	37.900	32.530	...	...	32,475	32,720	36,925	31,600	...	...	39	294,840	− 2,820
British Columbia	$ 400.814	411.847	423.738	414.811	445.263	...	373.029	438.378	454,425	457,709	491,964	...	17	1,842,476	+ 146,817
Buenos Ayres Lacroze	36.213	38.439	36.431	37.077	39,670	39,133	38.020	38.063	39,111	33,655	39,067	39,679	21	189.575	− 1.214
Burma	24,027	26.340	24.413	23.749	29.768	...	25.463	26,288	26,714	26.168	28,955	...	13	81.837	+ 3,907
Cape Town	...	...	13.394	...	14.238	...	...	16.067	15,480	...	17,128	...	—	—	—
Carthagena & Herrerias	3.512	2.371	2.081	1.779	2.539	2.252	5.325	5.763	4,164	4,306	2.805	3,932	47	45.142	+ 17,751
Cordoba	14.120	14.258	13.851	13.313	...	...	14.416	14,343	14.278	12.463	...	...	26	82.895	− 1.588
East India	2.283	2.220	2.522	2.523	2.080	1,942	1.186	1.183	1,562	1.512	1.229	871	17	5,174	− 3.893
Kalgoorlie	2.500	2.521	...	...	...	...	2.648	2.713	...	...	...	...	30	18.154	+ 696
La Plata	3.735	3.910	3.793	3.993	4.434	...	3.852	3.875	4.076	3,450	4,069	...	43	40,615	− 1.441
Lima	...	...	...	33.340	33.303	...	...	...	...	35.621	37.537	...	43	359.732	+ 22,341
Manaos ... ... Rs.	144.913	152.380	147.774	141.286	...	...	165.693	162.157	150.657	157.761	...	...	—	—	—
Manila ... ... $	59.432	...	...	...	...	...	73.900	...	...	...	...	...	—	—	—
Mexico ... ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	25.300	25.220	26.044	26.711	28.729	...	27,458	28,597	28.860	29.426	30,153	...	52	359.832	+ 12.060
Peruvian ... ... $	929.500	835.430	895.900	911.910	945.590	925.820	965.420	975.000	979.430	950,740	1047220	1034790	21	4.987,180	+ 472.530
Port Elizabeth ...	...	3.166	2.863	...	3.131	...	...	3,544	3.360	...	3.885	...	—	—	—
Rangoon	4.205	4.357	4.253	4.137	5.043	5.033	4.383	4,783	4.788	5,163	5.667	5,358	47	55.379	+ 1.975
Toronto ... ... $	884.491	867.789	889.241	913.535	907.460	...	984.529	954,192	1039819	1023517	1043886	...	43	9.934.998	+ 1,021.774
Winnipeg ... $	254.686	242.688	249.795	267.497	278.817	...	254.226	242.797	248.457	267.170	301.722	...	43	2.733,516	− 6.755

(*Continued on page 412*)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1916. WEEKS ENDED.				1917. WEEKS ENDED.				AGGREGATE.		
	Nov. 4.	Nov. 11.	Nov. 18.	Nov. 25.	Nov. 3.	Nov. 10.	Nov. 17.	Nov. 24.	Wks.	1917.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	403	426	449	363	423	453	480	443	33	14.764	+ 1.265
Aberdeen Corporation	1.841	1.958	1.817	1.770	1.999	2.205	2.011	2.021	25	54.526	+ 6.051
Accrington Corporation	*										
Ayr Corporation	272	271	265	262	323	341	328	335	28	14.467	+ 1.491
Bath Electric	*										
Belfast City	5.777	5.679	5.777	5.565	6.777	7.089	6.825	6.985	34	218.645	+ 24.664
Birkenhead Corporation	1.594	1.546	1.444	1.514	1.818	1.845	1.861	1.832	34½	62.932	- 9.527
Birmingham Corporation	14.375	14.461	13.046	12.618	19.424	19.344	19.366	19.550	34	624.841	+ 74.315
Birmingham Corp. Motor Omnibuses	1.014	1.044	1.108	1.069	1.197	1.184	1.195	1.215	34	35.724	+ 1.177
Blackburn Corporation	1.086	1.108	1.139	1.021	1.325	1.366	1.395	1.328	34½	51.934	+ 7.986
Blackpool and Fleetwood	...	345	297	...	...	424	379	...	43	41.623	+ 497
Blackpool Corporation	*										
Bolton Corporation	*										
Bournemouth Corporation	2.047	2.082	1.832	1.891	2.452	2.259	2.321	2.291	34½	90.724	+ 7.578
Bradford Corporation	6.392	6.223	6.263	5.990	7.095	8.097	7.478	7.513	34	264.258	+ 28.452
Brighton Corporation	*										
Bristol	5.046	4.704	4.730	4.461	5.619	5.777	5.456	5.492	47	255.386	+ 24.339
Burnley Corporation	1.695	1.574	1.535	1.522	1.789	1.841	1.856	1.821			
Burton-on-Trent Corporation	287	272	263	263	317	329	307	325	34	10.624	+ 1.034
Bury Corporation	1.343	1.313	1.220	1.223	1.540	1.549	1.560	1.508	34½	57.282	+ 7.170
Cardiff Corporation	*										
Chatham and District	1.234	1.179	1.191	1.049	1.115	1.184	1.147	1.260	47	60.125	+ 2.064
Chesterfield Corporation	*										
Colne Corporation	*										
Cork Electric	499	493	513	458	542	556	545	572	47	25.918	+ 1.826
Croydon Corporation	*										
Derby Corporation	1.160	1.134	1.010	1.008	1.207	1.235	1.258	1.258	34	41.593	+ 2.137
Dover Corporation	*										
Dublin and Lucan	*										
Dublin United	6.251	6.040	6.172	5.830	6.889	6.802	6.630	6.865	47	315.935	+ 30.240
Dundee City	1.370	1.363	1.355	1.326	1.463	1.504	1.531	1.535	27½	42.370	+ 3.958
East Ham Corporation	1.269	1.227	1.225	1.101	1.239	1.328	1.272	1.312	34	47.882	+ 2.899
Exeter Corporation	387	389	372	388	386	388	369	373	34	13.972	- 87
Gearless Motor 'Buses	*										
Glasgow Corporation	23.786	23.694	23.463	23.246	26.459	26.916	26.898	26.788	25½	671.984	+ 76.999
Glossop (Urban Elec. Supply Co.)	146	139	134	134	164	175	164	173	47	7.271	+ 727
Halifax Corporation	1.875	2.021	1.980	1.774	2.209	2.235	2.247	2.312	33½	84.446	+ 7.391
Halifax Corp. Motor Omnibuses	48	49	47	44	50	49	51	50	33½	1.646	- 49
Hastings and District	808	829	771	728	1.108	1.092	1.060	1.012	47	58.757	+ 9.499
Huddersfield Corporation	2.723	2.668	2.575	2.512	3.033	3.143	3.200	3.215	34	109.904	+ 11.499
Hull Corporation	*										
Ilford U.D. Council	651	640	587	599	690	726	708	742	34	26.258	+ 2.748
Ilkeston Corporation	*										
Ipswich Corporation	440	421	418	396	613	569	562	574	34	23.718	+ 5.508
Isle of Thanet	286	279	244	235	151	160	147	150	8	1.323	- 946
Kilmarnock Corporation	169	172	169	171	199	213	203	205	27½	5.501	+ 567
Lanarkshire	2.312	2.267	2.340	2.166	2.774	2.848	2.878	2.896	47	130.309	+ 21.307
Lancashire United	1.796	1.821	1.830	1.674	2.341	2.466	2.407	2.483	47	110.560	+ 24.547
Leeds City	9.641	9.417	9.418	9.146	10.739	10.922	11.032	11.006	34	377.552	+ 39.893
Leicester Corporation	3.435	3.353	3.336	3.307	3.864	3.960	3.940	4.064			
Leith Corporation	864	846	834	811	1.025	1.052	1.055	1.047	27½	29.965	+ 5.372
Leyton U.D. Council	1.520	1.503	1.513	1.351	1.701	1.772	1.838	1.817	34	64.508	+ 7.205
Liverpool Corporation	14.321	14.230	13.983	13.676	15.964	16.384	16.189	16.498	46½	731.471	+ 68.572
Llandudno and Colwyn Bay	221	222	213	199	253	237	253	235	51½	17.833	- 778
London County Council	47.482	45.549	47.356	43.319	52.306	54.084	55.476	55.271	33½	1.869.174	+ 237.089
London General Omnibus	*										
London United	*										
Lowestoft Corporation	*										
Maidstone Corporation	196	197	199	176	217	221	221	219	34	8.410	+ 800
Manchester Corporation	18.641	18.514	18.108	17.928	20.762	21.096	21.009	21.493	34	705.840	+ 59.206
Metropolitan Electric Tramways	*										
National Steam Car	*										
Nelson Corporation	198	185	185	194	242	223	224	215	34	8.051	+ 680
Newcastle-on-Tyne Corporation	6.998	6.918	6.772	6.572	7.944	8.022	8.064	8.000	34	268.042	+ 38.674
Newport (Mon.) Corporation	*										
New St. Helens and District	1.056	1.049	1.039	922	1.188	1.233	1.223	1.254	21	31.144	+ 7.534
Northampton Corporation	735	739	724	720	851	844	836	865	33	28.636	+ 4.040
Nottingham Corporation	3.859	3.904	3.923	3.608	4.544	4.599	4.481	4.625	34	150.533	+ 15.729
Oldham Corporation	2.347	2.294	2.108	2.227	2.751	2.740	2.676	2.733	35	99.754	+ 12.071
Portsmouth Corporation	2.404	2.335	2.144	2.163	2.676	2.540	2.641	2.550			
Preston Corporation	*										
Provincial	2.046	1.986	1.927	1.866	2.314	2.326	2.279	2.291	7½	18.347	+ 1.959
Reading Corporation	904	850	838	802	1.120	1.097	1.051	1.044	34½	36.030	+ 6.589
Rhondda Tramways	1.337	1.287	1.297	1.194	1.610	1.551	1.569	1.576	47	70.698	+ 10.216
Rochdale Corporation	*										
Rotherham Corporation	1.629	1.654	1.546	1.600	1.930	1.855	1.899	1.896	34½	62.701	+ 8,423
Salford Corporation	5.401	5.370	5.055	5.164	6.622	6.458	7.344	6.541	34½	228.386	+ 38.062
Sheffield Corporation	10.588	10.849	10.353	10.585	12.352	12.320	12.511	12.484	35	421.229	+ 50.318
Southampton Corporation	1.771	1.676	1.666	1.512	2.151	2.133	2.082	2.011	33½	69.477	+ 11 923
Southend-on-Sea Corporation	699	691	693	602	583	617	636	628	34	32.579	+ 1.023
South Metropolitan Tramways	*										
South Shields Corporation	821	790	828	805	918	908	921	953	34	32.597	+ 3.672
Sunderland Corporation	1.631	1.631	1.555	1.627	1.837	1.807	1.836	1.838	34	62.411	- 5.491
Sunderland District	647	647	644	646	812	793	756	801	4	2.351	- 414
Swindon Corporation	201	196	207	192	254	257	261	258	33½	9.218	+ 2.209
Torquay Tramways	499	460	490	431	678	646	672	650	47	31.409	+ 3.264
Tramways (M.E.T.) Omnibus Co.	*										
Tyneside Tramways and Tramroads	...	589	525	...	...	806	811	...	21	18.921	+ 4.749
Wallasey Corporation	1.221	1.197	1.197	1.149	1.410	1.430	1.398	1.428	34½	54.952	+ 6.658
Walsall Corporation	814	808	807	747	1.010	1.020	1.022	1.037	34	33.537	+ 4.737
Walthamstow U.D. Council	1.002	955	938	915	1.089	1.136	1.136	1.152	34	42.654	+ 4.485
Warrington Corporation	524	521	513	491	579	671	672	674	34	18.806	+ 1.861
West Ham Corporation	3.160	3.027	2.997	2.781	3.353	3.542	3.613	3.659	33½	124.515	+ 13.869
Wigan Corporation	1.697	1.729	1.705	1.646	2.087	2.133	2.123	2.153	34	7.904	+ 10.072
Wolverhampton Corporation	*										
Yorkshire (West Riding)	1.802	1.886	1.569	1.675	2.222	2.311	2.186	2.213	47	100.076	+ 17.361

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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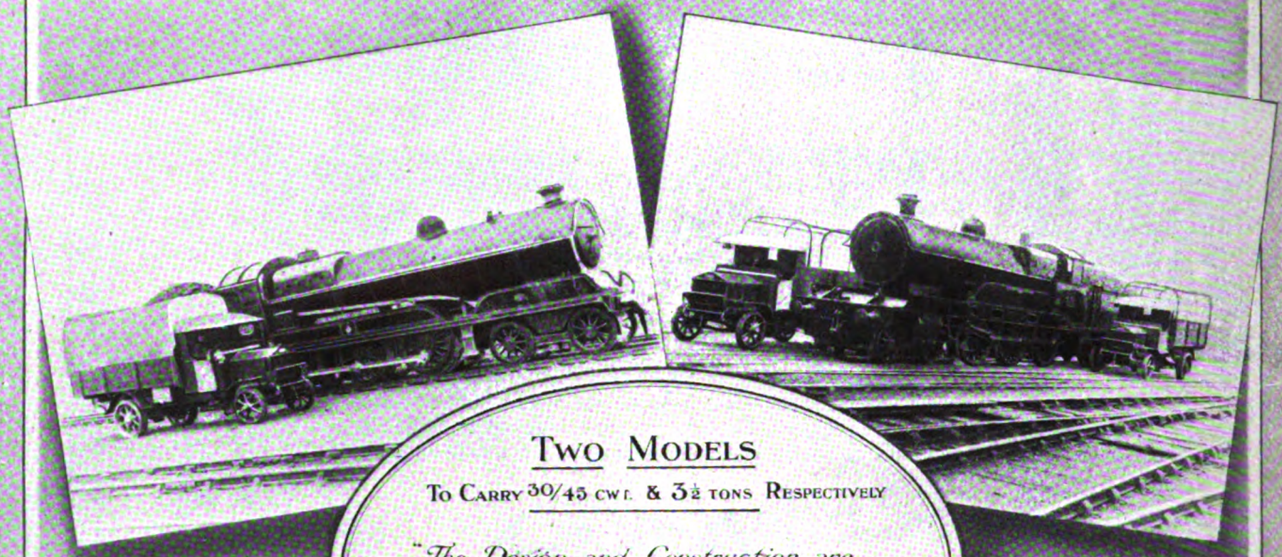
MOTOR VEHICLES.



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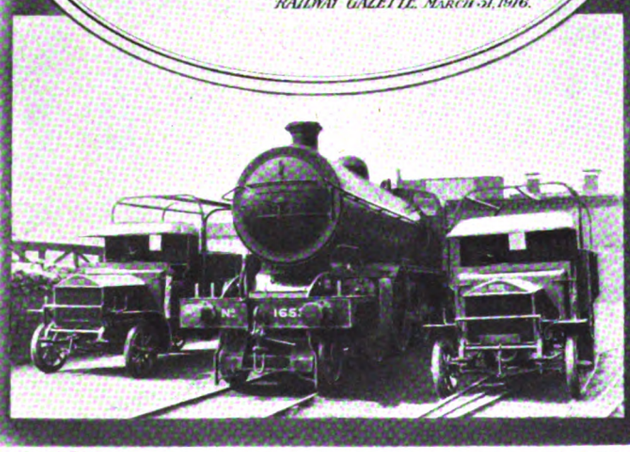
RAILWAY GAZETTE, MARCH 31, 1916.

IN PEACE

USED BY THE LARGEST CARRYING COMPANIES AND COMMERCIAL HOUSES.



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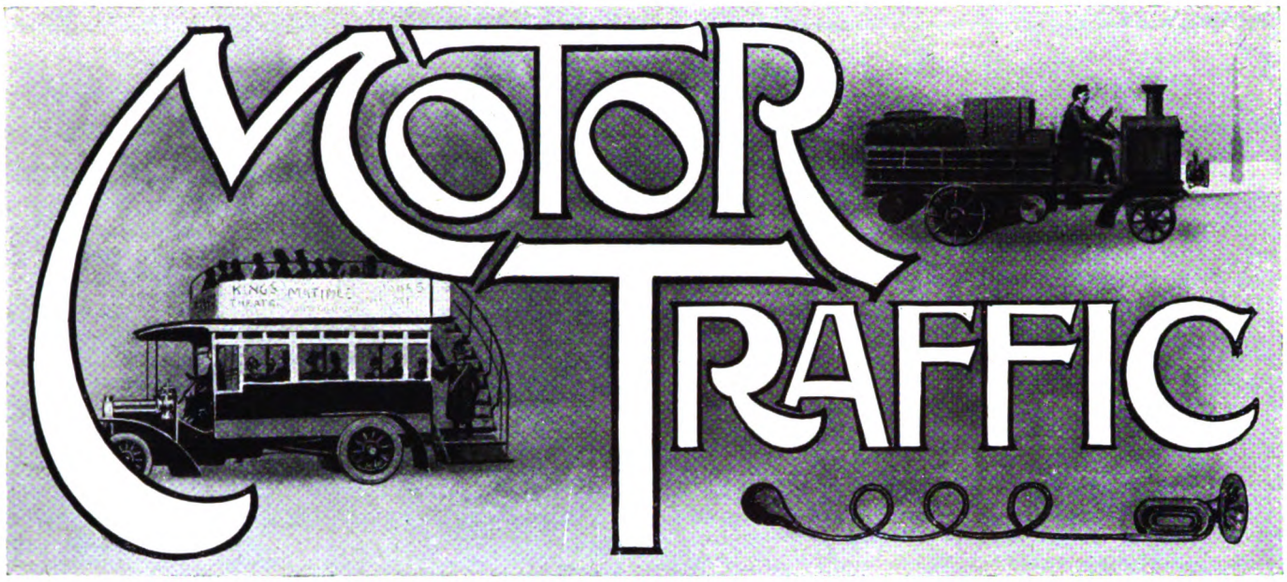

At the time of writing the latest news with regard to gas traction is the appointment by the Government of an Advisory Committee, whose names are given elsewhere in this issue, to investigate the subject, and to make representations as to what action should be taken to encourage and safeguard the use of gas for the purpose. A hint to the effect that motorists who are not qualified to obtain petrol may not be permitted to use coal gas had previously been given, but it is to be hoped that unless shortage of supplies makes action along these lines imperative it will not be taken. There are many purposes for which motor cars are usefully employed, but which are not regarded as sufficient qualifications in seeking permits for petrol supplies. Our public service facilities are already very much overtaxed, and it is not desirable, if it can be avoided, to congest them still further. The hint that coal gas may be reserved for what are regarded as essential purposes leads to the supposition that the next step may be a refusal to grant petrol to owners of commercial vehicles who cannot prove that the conditions of use of these vehicles are such as to preclude the possibility of employing coal gas as a fuel. The efforts that are being made to co-ordinate traffic facilities are all in the direction of limiting the radius over which industrial motors shall be used, and allocating long-distance haulage almost entirely to the railways. It is conceivable that we may finally reach a point at which petrol will only be granted to the Services, and for use to a limited extent on agricultural tractors employing paraffin as a main fuel.

* * * * * *

The work of traffic co-ordination appears to be proceeding simultaneously along three lines. One of these is the effort to co-ordinate rail and road transport, assigning to each the duties which it is qualified to perform most economically. In this attempt there must always be some exceptions to the general rule. In certain instances prompt delivery and the avoidance of handling *en route* are of more importance even than the saving of petrol or general economical considerations. This may well be the case with regard to the carriage of many classes of perishable foodstuffs, also of certain materials urgently required in connection with the manufacture of munitions of war. The second effort towards co-ordination lies along the line of endeavouring to obtain return loads for all vehicles. This is a policy the advantages of which we have pointed out on more occasions than one. To put it into effect, what is required is some central bureau that shall establish prompt communication between firms located in various centres. If a van is to run loaded from A to B, a trader must be found at B who wishes to have a load transported to A, or to some more or less intermediate point C, from which again another load can be taken to A. Thus the ton-mileage of the vehicle may be much increased without a corresponding increase in vehicle miles. Evidently some payment must be made to the owner of the vehicle by the other people who utilise it. It is considered wisest to base this payment on the capacity of the vehicle and the number of hours during which it is engaged. This is better than a payment based on mileage, because it discourages delays in loading and unloading, and this saving of time in turn tends to increase the mileage covered.

* * * * * *

A third method of co-ordinating traffic involves the fairly close co-operation of a number of trading concerns. Vans owned by individual traders often go out only partly loaded, and return nearly, if not quite, empty. If a number of traders can be made to pool their deliveries, fuller loads can be assured, and a smaller number of vehicles will serve the aggregate needs of the whole group. Thus a trader may at present operate half a dozen vans, not because he can fill them all, but because he has to serve half a dozen different districts. If he were to take part in a pooling scheme his vehicles might only serve the one or two districts where the bulk of his trade is done. For others he might be dependent on the services of vans owned by other traders in the group. This method of pooling will apparently be limited to a certain area of delivery from any particular centre, and each centre will have a specified area beyond which its traders may not deliver by road to their customers. The obvious objection to this proposition is that it interferes with normal trade competition, which might result in the public being exploited by local firms forming themselves into a ring to push up prices, and no longer restrained by fear of outside competition.

* * * * * *

It is a great pity that the whole question of the co-ordination of traffic and the elimination of unnecessary delays and expenses was not given proper consideration many years ago when congestion in London and other great cities had already become acute. We are reminded of our national negligence in this matter by the recent reception by the President of the Board of Trade of a deputation which asked for

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MOTOR TRAFFIC.

a complete investigation into the principles and operation of Mr. Gattie's Central Clearing House scheme. The scheme has been before the public for a long time, but an inquiry into its possibility has been shirked by the Board of Trade, possibly from fear of antagonising great established interests, or as a result of the influence that these interests exert. The present position is that it is out of the question to attempt, as a war measure, to apply such a scheme on the scale which will be necessary to make it fully operative in London. Sir Albert Stanley gave its exponents a very friendly reception, and was undoubtedly right in limiting the encouragement offered to them at the moment to a clear indication that facilities would be freely granted to apply the scheme promptly on a moderately large scale at some point other than London where serious congestion and delays are common. We hope that the promoters will be contented with that suggestion, and will make haste to act upon it. If, as seems very probable, the scheme proves fully successful in practice, its effect upon our railway rates and the speed and transport of goods will in a few years be enormous. The experiment must first be tried on a reasonable scale, because, however small the risk of failure, no risk at all could be taken in the case of London, because the consequence of failure would be too appalling. Briefly, if the scheme pans out thoroughly well in practice, it will mean immense economies due to the scientific sorting of good and the elimination of terminal delays, and though primarily intended as a means of increasing efficiency of the railways, it must affect almost equally the future of road-borne traffic, eliminating the slow-moving vehicle from our streets and substituting a much smaller number of capacious but reasonably speedy motor lorries. The effect should then be a very fair solution of the great problem of removing traffic congestion.

It is of interest to ascertain if any steps can be taken to ease the present burden on road users and the authorities responsible for upkeep. The matter was surely of sufficient importance to have been considered by the Reconstruction Committees appointed by the present Government and their predecessors. Failing that course it is worth while to examine the views expressed by road engineers at the annual conference of the Institution of Municipal and County Engineers. Their opinions came to light during the consideration of the question of "Extraordinary traffic and excessive weights on highways," introduced by Mr. Wakelam, county engineer of Middlesex. A great part of his paper had reference to omnibus traffic, beginning with the Abingdon Rural Council's action against the Oxford Tramways Company, in which damages working out at about 3½d. per car-mile were awarded, and upheld in the appeal court. The tenor of the debate was that litigation under this head ng is a lottery. In our estimation it belongs to the dark age, when the vehicle was made to fit the road, as an article in our issue of August 9 described it. More satisfactory is Mr. Wakelam's support of the principle of the charge of ⅜d. per car-mile on omnibus traffic which was granted by Parliament to his Council in the Act for the construction of the Great West Road; that is a continuation of the policy adopted in regard to omnibuses and railless trolley cars run by municipal bodies outside their own boundaries.

There were only two passages in the address that may be classed as suggestions for relieving present difficulties. One was a plea for amended regulations as to speed; the other for a reduction in size and weight. The former is feasible as a condition of granting licences, as has been seen in Neath, where, according to the surveyor of that borough, very little damage has been done to the roads in the centre of the town, though it is greater on the outlying portions, where it is impossible to keep observations on the speed. Nor can this be remedied by fitting governors to the engines, as is the case with many commercial machines. Governors would be designed to limit the speed to the legal maximum of 12 miles, and although such a provision was insisted upon in the regulations issued by the Metropolitan police seven years ago it has never been enforced. Instead, in order to compel observance of the legal limit the police rely upon timing as in the case of motor cars. Doubtless Mr. Wakelam obtained the suggest on of introducing a smaller and lighter vehicle from the recent proposal of the Commissioner of Police, in connection with the new vehicles that will be required on the termination of the war. Sir E. Henry's project, however, is not viewed with approval by omnibus operators and builders, the retention of the present seating capacity being considered necessary for profitable working. In an amended list of suggestions published in this issue the Commissioner makes it clear that he has no intention of securing a reduction in seating capacity.

* * * * * *

Several other ideas advanced by Mr. Wakelam failed to secure support from surveyors whose roads carry heavy omnibus traffic, notably Birmingham and Sheffield, where the local authorities own the vehicles. Mr. Stilgoe, of the former city, declared that to-day it was impossible to regard motor vehicles as extraordinary traffic, and he insisted that the general increase of traffic must be met by better construction, for such traffic meant increased business and local profit. Mr. Hadfield rightly stated that large profits were not made outside of London; therefore it was useless to ask owners to make large contributions to the rates. In Sheffield, he remarked, there are water-bound and tar-bound roads over which omnibuses had run for four years without complaint. Mr. Silcock (Westminster) clinched the argument against a contribution by stating that provincial areas should not pay more than metropolitan (where nothing is paid), because the takings were less. On the general claim advanced by Mr. Wakelam for a contribution for extraordinary traffic, the speakers were mostly in favour of arranging settlements. If their arguments mean anything, it is that the Abingdon case implies a stretching of the law, which was intended to apply only to the haulage of materials.

POST-WAR USE OF LORRIES.

In view of the injury that would be occasioned to the motor industry by the indiscriminate disposal of Government motor lorries after the war, the Society of Motor Manufacturers and Traders have made known their views on the question to the Ministry of Reconstruction. Dr. Addison, who is at the head of the Ministry, recently set up an Advisory Committee to consider the disposal of surplus Government property and stores after the war. The committee will hasten on the preparation of inventories by Government departments. In a statement issued on November 24, the Ministry invited suggestions from the public as to post-war use of Government stores.

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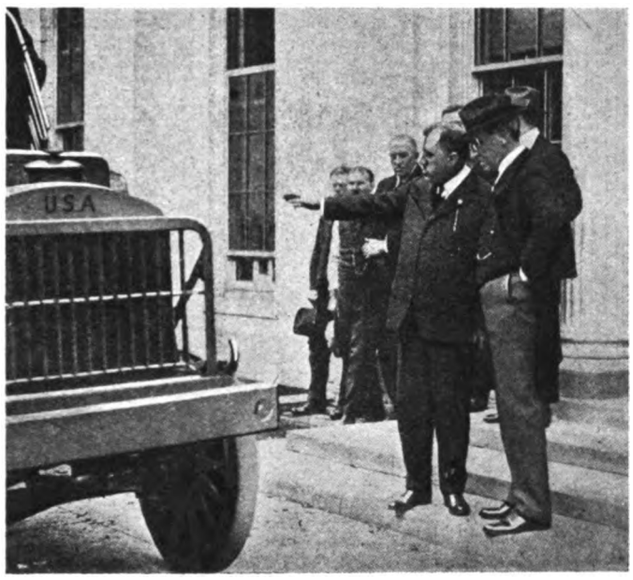
MOTOR TRAFFIC.

UNITED STATES ARMY WAR SERVICE TRUCK.

On this page we reproduce photographs of the Class B motor truck designed at the instance of the United States Government for war service in Europe. Thirty-five thousand of these standardised vehicles are being made as a first instalment. The assembly was completed in three days and three nights, one being put together at Lima, Ohio, and one at Rochester, New York, and afterwards driven to Washington as a test before parts are put through in quantities.



President Wilson Inspects the First Army Truck at the White House.

The *Commercial Vehicle*, of New York, states that the pay to the assemblers is to be cost plus 15 per cent., and that some well-established factories contend that the remuneration is too small and will entail too great a sacrifice on their part. Our contemporary urges that as the Government are going to buy the parts they should eliminate difficulties with the assemblers by determining to build their own trucks.

Weights of Principal Units.

Class B truck is designed for a 3-ton load and a capacity for 5 tons. Criticisms as to the truck being too heavy for its carrying capacity have been largely dissipated by official weight figures. The weight of the chassis without body is 8,600 lb., which, with a 1,600-lb. body, will bring the total up to 10,000 lb. This is very little heavier than some of the best 5-ton trucks now on the market. There are several places where weight can be reduced with ease.

The motor weighs 1,012 lb., which is scarcely more than 100 lb. above the weight of engines for similar trucks now on the market. The rear axle weighs 1,592 lb., the front axle 352 lb., the gear box and gears 233 lb., the clutch and case 103 lb., the frame without castings 653 lb., the front springs 148 lb., the rear springs 544 lb., and the body 1,600 to 1,800 lb. With different makers these weights vary from 40 to 50 lb. in the cases of the motor, and there are smaller variations with other parts.

The assembling and the designing constitutes a new record, the first truck, according to schedule, having to be ready for the road October 10. It was ready two days ahead of schedule. The two trucks assembled as experimental ones have exceeded the expectations not only of General B. Baker, of the Quartermaster's Department, which has directed the work, but also the expectations of 40 engineers who worked on the designs in Washington. Early motor tests showed 58 H.P. at 1,350 revolutions per minute, and the engine torque curve has been better than anticipated. The first orders for 10,000 parts were widely placed over the industry, generally three or more different firms receiving orders for each of the different parts.

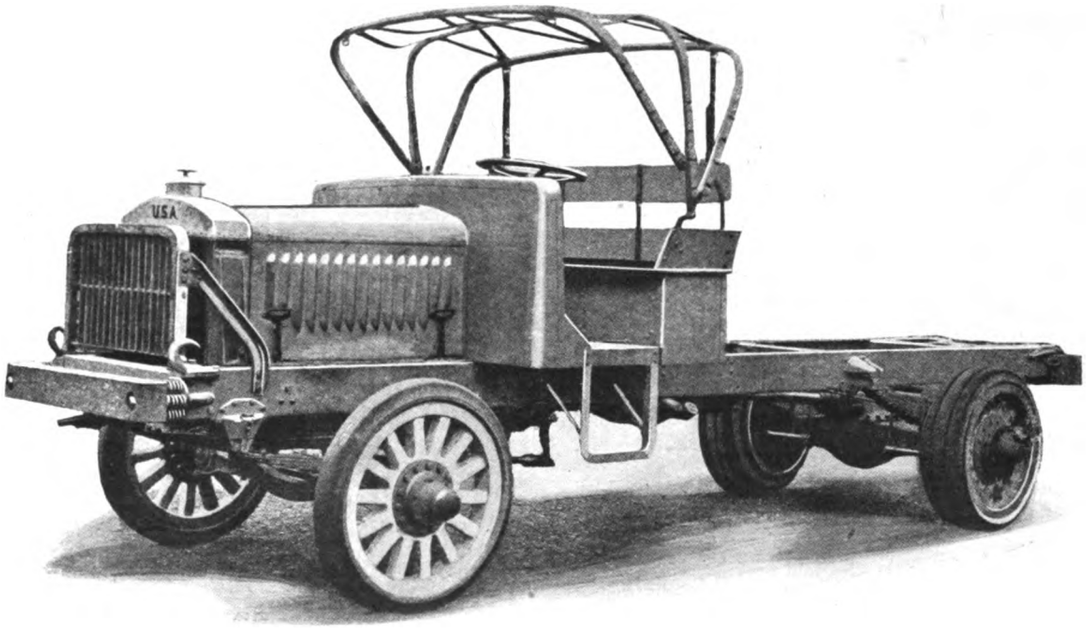
Speedy Production.

There were four major divisions of the engineering work, (1) the engine, (2) the transmission, (3) the axles, and (4) the chassis parts. Each was executed by a corps of engineers. There were three, four, and in some cases five different companies represented in the work on one unit. The engineer best qualified for a certain task handled that in consultation with his fellow engineers.

It was unbelievable to many that the truck could be designed and produced in the stipulated time. The speed with which the different makers completed their respective tasks is shown (the *Commercial Vehicle* states) by the following:—

The Continental Company, which was one of the several engine firms to work on the engine, got blue prints on October 9 and the engine was running in 19 days and 18 hours.

Waukesha got the first engine running in 11 days 7½ hours from the time the blue prints reached them. The patterns for castings and dies for forgings had been previously made, but the companies had to do all the machining and other operations on the parts.



The United States Army War Service Truck.

In developing the engines, four or five makers co-operated by dividing the different parts among them, one firm making several parts, not only for itself but for the other engine makers. Thus, Continental made the cylinders, gear case cover and many small parts

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MOTOR TRAFFIC.

such as pumps, bushings, etc. Waukesha manufactured the cylinder heads, the crank case, intake and exhaust manifolds, roller push rods, etc. Wisconsin made the lower part of the crank case.

The engine is a composite design, involving a combination of the best engineering knowledge of the country. Thus in summarising the co-operating talent embodied in it, it might be said that the crank case is Continental, the cylinders Waukesha, the oiling system Wisconsin, the pistons Hercules, and the timing gear system a combination of Buda, Wisconsin and Continental. The governor is a combination of Kelly-Springfield and Waukesha. The cam shaft is a composite design.

VIBRATIONLESS ENGINE.—MASSIVE RADIATOR GUARD.

The engine was built in the Continental plants but is the result of Continental, Waukesha, Buda, and Wisconsin engineering and manufacture. It is said to be vibrationless and has detachable heads with cylinders measuring 4¾ × 6. The crank case is aluminium.

The axles, both front and rear, embody both Timken and Sheldon design. The rear axle is a full-floating type. Wheels were to have been steel, but could not be obtained, so wood was used. The engine has been designed for the use of heavier fuels, including kerosene.

The petrol supply is carried in a tank under the seat and fed to a dash tank, whence it goes to the carburetter by gravity. On the main tank there is a large faucet, so that fuel can be drawn quickly and put in the dash tank in emergency. The clutch is a dry disc,

United States Army Truck with Hood.

and the 4-speed gear was built by the Warner Company and is the result of engineering design and construction of several companies. The universals are Spicers.

The radiator is an extremely thick one of the cast type, protected by a massive guard. There is a coil spring bumper both front and rear. Another feature is the use of hollow spring shackle casting in which oil can be carried and fed by wick to the spring shackles and bolts. The brake control brackets are lubricated in the same way. The photographs do not show the front fenders, which are very strong. They form a platform on which the mechanic can sit or stand when repairing the engine. The frame is very securely braced, especially at the rear, and provision is made for fitting a trailer hook.

INSPECTION BY PRESIDENT WILSON.

Upon the arrival of the trucks at Washington, whither they had journeyed under their own power over the mountains, President Wilson and his Cabinet viewed them in the White House Park. Mr. H. L. Horning, chairman of the Automotive Products Section of the War Industries Board, explained the features of the truck, and mentioned that it had been produced two days ahead of the schedule. The President was interested to learn that the truck can operate on inferior grades of fuel if the necessity arises.

Secretary of War Newton Baker said that he knew of no greater evidence of the enthusiasm of the people in co-operating in preparation for the war than the two mechanical triumphs that had been worked out in the production of the Liberty motor for the airplane service and the standardised truck for army transport.

Since the description of the truck was written there has been a change from demountable tires to the pressed-on type. The complete truck with body, top, and equipment weighs just over 10,000 lb. (5 tons), the chassis, with driver's seat and in running condition, scaling 8,600 lb.

THE CONSTRUCTION OF MOTOR OMNIBUSES.

REVISED SUGGESTION BY THE METROPOLITAN POLICE.

Sir E. Henry, Commissioner of Metropolitan Police, has issued the following notice inviting the co-operation of manufacturers and designers of motor omnibuses :—

The Commissioner of Police of the Metropolis, as the authority for licensing public carriages, issued a notice dated April 3, 1917, with regard to the future construction of motor vehicles intended for licensing as motor omnibuses within the Metropolitan area. Since that date he has received several communications from those concerned with the manufacture and use of these vehicles. In 1909, acting upon expert advice and after a conference with manufacturers and users, the Commissioner notified that no new vehicle would be licensed for public service which exceeded three and a half tons unladen weight, or, alternatively, which exceeded a gross weight fully laden of six tons.

Even with those limitations of weight, representations are still being received from residents along omnibus routes, who complain of the excessive vibration caused by these vehicles, and of the damage done to their houses. As stated in the notice of April, 1917, the present time appears opportune for reviewing licensing requirements, and summarising those deemed of cardinal importance.

It is not proposed to insist upon vehicles of smaller dimensions or with less seating capacity than the existing type. On the other hand, it is not contemplated to agree to any increase in size or in seating capacity, as the existing scale of a maximum of 34 seats best meets London traffic requirements.

It is realised, in respect of the weight of the vehicle and weight effect on roads, that improvements may be secured by careful reconsideration of all the details of construction of the chassis, road wheels, power and transmission mechanism, including the use of modern materials of high mechanical properties, and that the reduction thereby effected will compensate for any slight additions of weight needed for the improvement of springs, wheels, etc.

In the Commissioner's opinion, he would be justified in agreeing to some increase of weight in component parts needed to secure improvement in springing and in the wheels, the object aimed at being reduction of impact shock, more especially on damaged road surfaces, but for this increase of weight in certain parts there should be a reduction elsewhere.

In summarising the points of cardinal importance, attention is called to the following :—

1. The seating capacity of the motor omnibus shall be for not more than 34 passengers.
2. The weight shall not be more than three and a half tons unladen or six tons fully laden.
3. The weight must be so distributed that the front wheels are not unduly loaded.
4. The length of the vehicle must not exceed 23 feet.
5. The breadth overall must not exceed 7 ft. 2 in. at any part.
6. Each vehicle must be provided with two effective and independent and independently operative brakes acting on the back wheels.
7. The wheel track should not be less than 5 ft. 6 in. centre to centre of tires for both front and back wheels.
8. The distance between the outsides of the back springs shall not be less than 45 in., and of the front springs not less than 38 in.
9. The requirements as laid down in the Notice to Proprietors of August, 1909, may be referred to, but the Commissioner does not think it advisable to enter into greater detail lest he should thereby appear to be hampering designers.

The Commissioner invites the co-operation of manufacturers in designing and constructing vehicles which can operate in the streets without affording ground for complaints. Any representations that may be put forward will, of course, receive the most careful attention.

REGISTERED TRUCKS IN THE U.S.A.—The number of registered trucks in the United States at the end of the first six months of 1917 was 135,603. This does not represent the total number of trucks in use, which was probably near the 500,000 mark, but simply includes those where the State authorities register a commercial vehicle as such, rather than classing it in with the passenger cars under the head of motor vehicles. In the States which register trucks, New York is the leader with 54,856, Massachusetts next with 21,974, Pennsylvania next with 14,785, and Connecticut next with 9,957. These figures have since been largely increased owing to purchases of motor vehicles in order to relieve railway congestion created by the entry of the U.S.A. into the war.

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GAS TRACTION COMMITTEE.

It was officially announced on December 1 that Mr. Walter Long had made the following appointments to the Gas Traction Committee which the Government recently decided to establish :—

Sir Boverton Redwood, director of Technical Investigations, H.M. Petroleum Executive (chairman).
Major Aston McNeill Cooper-Key, C.B., H.M. Chief Inspector of Explosives, Home Office.
Sir Evan D. Jones, Petrol Controller, Board of Trade.
Mr. H. H. Law, C.B., Chief Engineering Inspector, Local Government Board.
Sir Arthur Churchman, Controller of Mineral Oil Production, Ministry of Munitions.
Mr. W. Doig Gibb, Technical Adviser on Gas-Works Products, Ministry of Munitions of War.
Mr. Charles C. Carpenter, Ministry of Reconstruction.
Mr. Edward S. Shrapnell-Smith, chairman of Joint Committee of Mechanical Road Transport Associations, Economy Officer H.M. Petroleum Executive.
Mr. James Ollis, Chief Officer, London County Council Public Control Department.
Lieutenant-Colonel R. K. Bagnall-Wild, R.E., member of Technical Committee of the Motor Industries, President of the Institution of Automobile Engineers.
Mr. F. W. Goodenough, chairman of Executive Committee of British Commercial Gas Association, member of National Gas Council.
Alderman William Kay, chairman of Manchester Corporation Gas Committee, member of National Gas Council.
Mr. George W. Watson, Inspecting Engineer to the Commercial Motor Users' Association (Incorporated).
Mr. W. Worby Beaumont, Technical Adviser to the Commissioner of Police of the Metropolis.

The terms of reference are :—To consider and report upon :—

1. The employment of gas in substitution for petrol and petroleum products as a source of power, especially in motor vehicles, and the manner in which such gas may be supplied, stored, carried, and used, with due regard to the safety of the public.

2. The action, if any, which should be taken by His Majesty's Government to encourage and safeguard the use of gas for this purpose.

Mr. Shrapnell-Smith will act as secretary for the time being, and communications should be addressed to him at 8, Northumberland Avenue, W.C.2.

GAS IN USE ON G.W.R. ROAD VEHICLES.

The *Great Western Railway Magazine* states that the company are making a start with gas as fuel for some of their large fleet of passenger and cartage road motors, the Lyon-Spencer container being used. In an article describing the conversion to gas traction the feeding of gas to the engine is described as being "easily effected, the simplest method being to tap a jet (about $\frac{3}{8}$ in. for 3-ton vehicles) into the induction pipe and to interconnect a gas throttle with the one already located between the carburetter and induction pipe. Other variations of method can be made, more complicated than this, but producing a more complete admixture of the gas and air. One of the great advantages of gas is the negligible additions which have to be made to the engines, it being suitable without preparation for any engine designed to run on petrol, benzol, or hydrocarbon spirit.

"In the case where road vehicles (such as railway passenger or parcel cars) are timed to fixed schedules, what may be termed 'composite' running can be made a basis of operation; i.e., where the necessary time between the trips is sufficient to allow for recharging the gas container (about 15 minutes), gas can be used as fuel; whereas, where the time is shorter, the petrol cock can be opened, and that trip carried on on the latter fuel.

"Gas companies mostly charge for gas for motor traction by the fixed capacity of the container at so much a recharge; so that it is sometimes advisable to have a container of such a size as will ensure its being quite empty when taken to recharge, running the last quarter-mile on petrol.

THE COMPRESSED GAS PROBLEM.

"It seems obvious that the flexible container cannot be the last word, and many inventive minds are busy on the problem of carrying compressed gas in cylinders. At the present time compressing plants and metal for suitable cylinders are almost impossible to get, and the flexible container will probably remain with us as a war-time emergency.

"About 250 cubic feet of coal gas give equivalent *power* to one gallon of petrol; and a single cylinder compressor of 4-in. by 5-in. stroke, running at about 400 revolutions per minute, would fill a cylinder with 250 cubic feet of gas at a pressure of 20 atmospheres in about 15 minutes. It is not hard, therefore, to work out the requirements for any road motor vehicle in the direction of compressed gas.

"The limitations are (1) *weight*, which points either to composite thin cylinders having strengthening rings shrunk on at intervals and longitudinal tie rods, or to some alloy metal lighter than steel, being employed; (2) *upkeep*, having in mind the stresses involved; and (3) *life of material*, being highly stressed metal subjected to continuous shocks from the vehicle's motion. Also with compressed gas a governor is involved, whereas the flexible low pressure container acts as its own governor, the engine just sucking from it what it requires and no more.

"An attractive proposition is the possibility of vehicles which have short runs and sufficient time between trips, carrying their own gas compressors operated by the main engine whilst the car is standing."

TOWER WAGON WORKED BY GAS.

We are indebted to Mr. C. Clarke, manager of Birkenhead Corporation Tramways, for the accompanying photograph of a tower wagon fitted with a gas container. The wagon is a 35-H.P. Halley

chassis, and the gas container measures 12 ft. by 6 ft. by 5 ft., and has a capacity of 360 cubic ft. This charge is sufficient to run the wagon from seven to eight miles. It has been working quite satisfactorily for several weeks.

WAYSIDE SUPPLIES FOR MOTORS.

At a meeting of the Institution of Municipal and County Engineers, held on November 30 at the Geological Society's Rooms, Piccadilly, there was a discussion upon the questions raised by the circular letter sent to local authorities by the Commissioner of Police for the Metropolis relative to the installation on the highways of supplies of power or fuel for motor vehicles. The matter was discussed under the following headings :—

As to charging places in public highways for motor vehicles.

As to providing places and positions for taking in gas, electricity, petrol, coal, water, etc., for motor vehicles.

As to the powers of gas companies, electricity undertakings, etc., and of users of highways for such purposes.

Any other matter bearing upon or incidental to the above subjects.

The openers of the discussion were Mr. J. A. Brodie (Liverpool), Mr. A. E. Collins (Norwich), and Mr. H. E. Stilgoe (Birmingham).

Reporting on the subject to the Lambeth Council, the borough surveyor states that in the past few years the Council have found it necessary to remove most of the water standposts used for the filling of water-cars from the main roads to side streets. Moreover, the pavements of main roads already accommodate lamp-posts, tramway stopping signs, pillar-boxes, electric feeder pillars, sand-bins, etc., and any further encroachments would be undesirable. In certain side roads, where vehicular and pedestrian traffic is of a light nature, there would seem to be no great objection to the installation of plugs, stand-pipes, etc., for supplying motor vehicles, but such positions would need careful selection. In the case of water supply required for the use of steam wagons, for which there seems to be an urgent demand, it is suggested that standposts should be provided by the Metropolitan Water Board at various cab ranks, from which supply could be taken, and controlled either by some form of automatic prepayment meter or a man in attendance.

USE OF LORRIES TO RELIEVE U.S.A. RAILWAYS.—An appeal has been made to traders in the United States to use motor vehicles for distances up to 40 miles, in order to relieve the pressure on the railways entailed by military traffic.

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MOTOR TRAFFIC.

LONDON "SAFETY FIRST" COUNCIL.

USEFUL AND EFFECTIVE PROPAGANDA.

A meeting of the London "Safety First" Council was held on Wednesday, November 21, in the Council Chamber of the Guildhall, Westminster. Mr. W. Joynson-Hicks, M.P., presided. It was reported that the Beckenham Urban District Council had joined the Council. Messrs. W. J. Pincombe, secretary of the London Teachers' Association, and C. W. Crook, B.A., B.Sc., ex-president of the National Union of Teachers, were co-opted as members of the Council.

The Drivers' Educational Committee reported that it had under consideration particulars, which had been submitted to it for criticism, of a "Safety" cradle for horseless vehicles; also, that it had given directions for the issue of a new poster, "Don'ts for Cyclists," and that later on the "Hints to Drivers" should be issued in the form of an illustrated poster. The Publicity Committee announced that, to meet the demand for the "Safety" poster for pedestrians, an additional 5,000 copies had been authorised.

The Publicity Committee reported that the promotion of the "Safety First" essay competition for children had been sanctioned by the London County Council and other education authorities in Greater London.

Upon the joint recommendation of the Street "Safety" and Publicity Committees, it was decided to ask certain local authorities again to consider the question in view of the consensus of opinion in favour of the "Keep to the Left of the Footpath" movement.

The Railway "Safety" Committee reported that, to meet the demand therefor, arrangements had been made for the supply of 10,000 copies each of two posters entitled "Safety: Advice for Railway Employees," and "Safety: Advice for Railway Travellers," and, in addition, a number of cards containing suggestions for the prevention of accidents in railway workshops.

PRICE OF MOTOR FUEL REDUCED.

Following upon the recent 2½d. per gallon reduction, the companies forming the Pool Board (Petroleum Supplies), owing to further reductions in the Government war risk insurance upon vessels, reduced the wholesale prices of war motor spirit on November 26.

The new wholesale prices effect a reduction of 2d. in retail prices to the public of war motor spirit, the current prices of which in England and Wales are now as follow:—No. 2 war motor spirit, 3s. 7d. per gallon; No. 3 war motor spirit, 3s. 0d. per gallon; Scotland and Ireland, 1d. additional.

A reduction of 1d. per gallon in the prices of petroleum oil has been made for the same reason.

RESTRICTION OF OMNIBUS TRAFFIC.

Cumberland County Council have received an application from the Gretna Motor Company for sanction to use main roads for a motor omnibus service between Carlisle and Annan. After considering a report from the surveyor, the Highways Committee resolved that the consent be granted, on condition that a contribution be paid at the rate of 1¾d. per omnibus mile; that such consent shall be liable to revision at such time as the committee may deem necessary, and that in no case shall the company run a more frequent service than that stated in the application without the further consent of the committee.

Application having been made to Ellesmere Urban Council for sanction to an omnibus service proposed to be instituted on the North Road, the Council have replied that they cannot entertain the application at the present time.

In a report presented to Northamptonshire County Council, the Highways Committee state that the motor omnibus traffic on the main roads is greater on Sundays than on any other day of the week, and that it consists largely of non-essential traffic. In view of the excessive damage caused to the roads, the reduced supply of road materials, and the shortage of petrol, the committee were of opinion that Sunday traffic should be reduced to a minimum during the period of the war, and they recommend the Council to request the Government to give effect to that view.

A Napier in Railway Service.

L.C.C. AND THE RISK OF LEAKAGES IN GARAGES.

The Public Control Committee of the London County Council on November 14 presented a report on gas-filling installations at garages. As the filling process may possibly occupy a considerable time, there is risk, the committee stated, of inattention on the part of the operator which may result in a serious leakage of gas. The committee have, therefore, considered what precautions should be taken to avoid risks from installations fitted up at premises licensed to store petroleum spirit. It does not seem necessary to take any action if the gas-filling point is in the open air and at a distance of not less than 20 ft. from the petroleum storage place or filling point, neither does it appear necessary to raise objection to cars fitted with gas containers being garaged with petrol-driven cars if the garage is artificially lighted by incandescent electric lamps and is well ventilated at the roof level. As it is possible that, in the near future, an increasing number of these gas installations may be provided, the committee are in communication with the owners of garage premises licensed by the Council under the Petroleum Acts with a view to efficient measures being taken to obviate any risk of accident occurring through the means adopted for filling the gas receptacles or for lighting the premises. The committee will report after experience has been gained as to the general conditions which the Council should impose.

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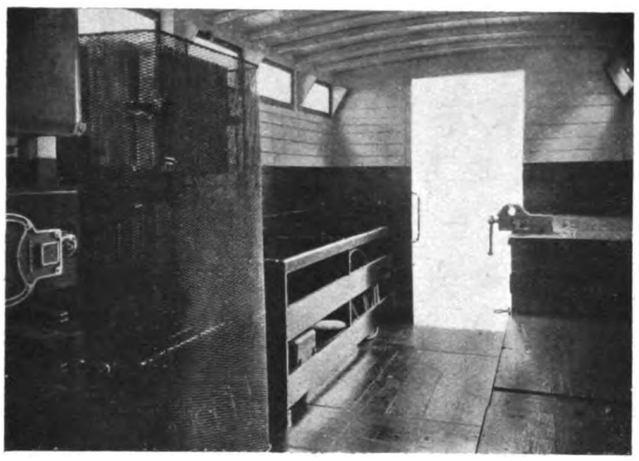
MOTOR TRAFFIC.

MOBILE ELECTRIC WELDING PLANT.

The accompanying views illustrate a mobile electric welding vehicle which Messrs. Tilling-Stevens, Limited, recently supplied

to Messrs. Fraser and Fraser, engineers and boilermakers, Bromley-by-Bow. This vehicle was supplied by permission of the Ministry of Munitions, and is completely equipped as an electric welder, with



the necessary control switchboard, relay switch, resistance cables, and electrodes, and the interior of the body is fitted as a workshop suitable for doing small repairs on the spot.

WALSALL OMNIBUS DISPUTE.

As a final effort to obviate litigation, the secretary of the Birmingham and Midland Omnibus Company has appealed to Walsall Watch Committee to grant licences for their motor omnibuses, but the committee have replied that they are unable to depart from their refusal. It will be remembered that the refusal was based on the alleged duplication of public services on the Walsall portion of the route, and also on the need for national economy in the use of petrol. The company continued to run their vehicles in Walsall, taking up passengers on private property. Consequently proceedings were taken before the local magistrates, who decided against the company, but the chairman suggested that an arrangement should be arrived at. In his letter to the Watch Committee the secretary says:—"Instead of acceding to the suggestion of the justices, your Council insist on the discontinuance of the through service between Walsall and Birmingham. To this my directors cannot agree, and in the face of the refusal of your Corporation to grant licences they must adhere to the method they have adopted to meet the convenience of the public, which method, they maintain, is legal, and will be upheld by the Court of King's Bench. It is in the national interests at the present time that the railways should be relieved as much as possible, and public announcements to this effect have been made from time to time, while with regard to the use of petrol and to the reference made to the company's communications, I can say that every endeavour has and is being made to economise in this direction, and as an example I might quote the company's experiments in the use of coal gas as a fuel. My directors have had many examples of the public inconvenience created by a change of vehicles *en route*, and of the impossibility of thus properly catering for the large number of passengers who travel by road between Walsall and Birmingham. It is well known to your Council that the public have often to wait their turn at the Walsall terminus for a seat in an omnibus. My directors ignore the statement that the service is a pleasure service only, which is refuted by the large number of passengers using the vehicles in cold, wet weather."

MOTOR VEHICLES FOR MUNICIPALITIES.

LEWES COUNCIL are obtaining a motor ambulance.

BARKING COUNCIL are raising a fund for purchasing a motor ambulance.

SPENBOROUGH COUNCIL have obtained estimates for the supply of a motor fire engine.

SLEAFORD RURAL COUNCIL propose to purchase a steam motor wagon at a cost of £837.

MONK BRETTON COUNCIL are considering the advisability of obtaining a steam wagon.

BLACKPOOL CORPORATION contemplate purchasing a motor fire engine at a cost of £1,200.

WEYMOUTH COUNCIL have been recommended to purchase an electric wagon at a cost of £1,200.

MANCHESTER CORPORATION have purchased two 4-ton Sentinel steam wagons for the Gas Department.

WHITEHAVEN COUNCIL have asked for sanction to raising a loan for the purchase of a motor fire engine.

MAIDSTONE COUNCIL have applied for sanction to borrow £1,200 for the purchase of a battery-driven wagon.

GREAT CROSBY URBAN COUNCIL have had a nine-year-old Napier touring car converted for use as a fire tender.

WALSALL COUNCIL have refitted a second-hand lorry at a cost of £93, compared with £730 expended on a new vehicle obtained in 1916.

WOOLWICH COUNCIL propose to obtain a Sentinel steam wagon from Messrs. Alley and MacLellan for £1,000 for the removal of ashes.

MORECAMBE COUNCIL are promoting a Bill in the next session of Parliament for power to acquire and work motor omnibuses in the borough and adjoining districts.

HALIFAX COUNCIL have decided to purchase two Ford chassis for the Health Department and one for the Street Cleaning Committee to be used in the removal of house refuse.

SOUTHAMPTON COUNCIL have placed orders for two additional lorries at £863 each, as the help hitherto given by A.S.C. vehicles in hauling road material is no longer available.

CROYDON CORPORATION'S 4-ton electric lorry has effected a saving in haulage charges of about £250 a year, according to a report presented by the manager of the electricity department.

LOSSIEMOUTH COUNCIL are inquiring as to the cost of obtaining an electric lorry, as the interest on a loan of £1,000 would be less than the cost of keeping a horse at the present price of fodder.

IPSWICH COUNCIL have purchased a first-aid fire motor vehicle of 29 H.P., capable of conveying four men, and fitted with equipment enabling one jet to be got to work immediately on arrival at a fire.

SYDNEY (N.S.W.) COUNCIL, owing to the heavy cost of horse cartage, have made an offer to the Public Works Department for the use of a number of steam lorries that the latter are importing in connection with the construction of the city electric railway, which work has been suspended owing to the war.

BY-LAW AGAINST EXCESS PASSENGERS ON OMNIBUSES.—Complaints having been made of overloading motor omnibuses running on the main roads of Northamptonshire, the Roads Committee have reported to the County Council that they are advised the authority have no power to make a by-law against overloading. The committee, however, are conferring with the Home Office with a view to the Secretary of State allowing a by-law to be included amongst by-laws which the Council had power to make for the good rule and government of its area. Certain urban authorities, possessing powers, had made by-laws, but considerable variation existed as to the number of passengers allowed. If it were found practicable for the County Council to deal with the matter, the Urban Councils would be consulted with a view to the adoption of a uniform practice.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

NO PETROL FOR OMNIBUSES.—West Bridgford Council have been unable to obtain the renewal of the contracts for petrol and paraffin for their omnibuses. Representations have been made to the Ministry of Munitions with a view to securing an extra licence for paraffin.

AUSTIN COMMERCIAL MOTORS.—Owing to the Ministry of Munitions' award to workmen, and the increased cost of materials, the Austin Motor Company notify that they have been obliged to increase the price of their commercial motor chassis to £750, delivered at works, as from December 10.

GLASGOW CORPORATION'S MOTOR CARS.—In view of the difficulties that would be experienced, the Garage Committee of the Corporation have decided not to entertain a request for the free use of their motor cars for conveying on Sunday mornings to the railway stations the voluntary workers at the canteens for soldiers.

THE INSTITUTION OF AUTOMOBILE ENGINEERS.—At the third meeting of the Institution of Automobile Engineers this session, held at the Royal Society of Arts, John Street, Adelphi, W.C., on December 12, Mr. A. E. L. Chorlton read a paper entitled "The Agricultural Power Unit: some factors governing the design of a small tractor."

LONDON TRAFFIC FACILITIES.—Mr. Wardle, replying to a question by Major Newman in the House of Commons on November 28, said he understood that the services on the London Underground Railways had not been reduced, but on the contrary had been substantially increased during the war. He regretted that it was not possible at the moment to increase the supply of petrol for omnibuses.

Dennis War Department Vehicles.

OMNIBUS TRAFFIC AND THE ROADS.—The Executive Council of the County Councils Association have adopted a resolution that having regard to the great cost of keeping up the county roads in a fit state for the motor omnibus traffic recently introduced for the profit of the owning companies, legislation should be carried out by the Government for the payment to the highway authorities of a fair mileage rate by the owners of such vehicles.

WAR TAX ON AMERICAN MOTOR VEHICLES.—President Wilson has signed the War Revenue Bill, under the terms of which manufacturers of motor vehicles will be required to pay a tax of 3 per cent. on all machines produced. The tax applies to private cars and motor cycles as well as to commercial vehicles. It will probably be ruled that trucks sold to the Government will be exempt from the tax. Owing to the narrow margin of profit now being made by the majority of the makers, the tax is being passed on to purchasers.

EXPERIMENTAL AIR MAIL FLEET.—Colonel Mervyn O'Gorman, consulting engineer to the Director-General of Military Aeronautics, and formerly superintendent of the Royal Aircraft Factory, lecturing before the Royal Society of Arts on Wednesday, said that the great air problem would be to bridge the hiatus between the cessation of aeroplane manufacture for war purposes and the starting of a commercial air fleet. The Government should now liberate a few machines and some pilots to initiate a mail and package carrying service.

MILITARY TRAFFIC AT SALONIKA.—The large number of motor vehicles in use by the British and French forces at Salonika has necessitated the construction of many miles of new roads and the conversion of existing tracks to a condition that will bear the traffic. Several steam rollers have been sent out from this country for that purpose, and others are being obtained. Among them is one that the Cumberland County Council have had in use for 27 years. Its cost was less than £400, and it has been sold to the Government for £200.

MOTOR AMBULANCES OF THE BRITISH ARMY.—Sir George Touche, in thanking the subscribers in the city ward of Walbrook for a motor ambulance presented to the Red Cross Society, said that when the war began the British Army had no such thing as a motor ambulance. Some 500 were provided by the Red Cross Society, and the number now exceeded 2,000, in addition to lorries for conveying hospital stores, soup kitchens, and surgical cars. Including all these, the number of Red Cross vehicles was now 3,100. Each ambulance has apparatus capable of bringing up the temperature in the vehicle to 80 degrees.

COMMERCIAL VEHICLE TIRES.—George Spencer, Moulton and Company, Limited, 239, Deansgate, Manchester, have issued their new list, 102, which will be invaluable for reference to owners and agents. It contains a new scale of prices and the buyer can thus more readily estimate his outlay, but exact and detailed quotations, with information about allowances, nearest fitters, etc., will readily be supplied by the head office, Solid Tire Department, Deansgate, Manchester. A feature which will be useful is a list of press owners in all parts of the kingdom, and this compilation should prove specially helpful to those who are not familiar with the facilities. A schedule of loads for each section of tire, the terms of guarantee and sale, and much other information is included.

DENNIS BROTHERS, LIMITED.

For the year ended September 30 the net profits, including £16,530 brought forward, were £87,406. After placing £15,000 to reserve and £85,000 to reserve for estimated liabilities, a further dividend of 5 per cent. and a bonus of 7½ per cent., making 17½ per cent. for the 12 months, were recommended, and £19,906 carried forward. The net profits for 1915-16 were £120,186, for 1914-15 £147,220, and for 1913-14 £61,484.

At the annual meeting on November 31, in moving the adoption of the report, the chairman, Mr. H. B. Andrews, referred to the strenuous character of the work that the company had had to perform. There had been a continually increasing demand for a greater output of their standard line of manufactures, and the company, by reason of continuous extension of premises, equipment, and means of production generally, had largely succeeded in meeting the demands for more and better vehicles. Since 1913 the working factory space had been doubled. The company had acquired adjoining land which would permit them to treble the present factory space. The directors hoped that all the extensions would be completed during the next few weeks.

TRADE POLICY AFTER THE WAR.

They were now in possession of a plant so far ahead of former peace requirements that the position after the war must to a large extent depend on the country's future trade policy. At present they had but one customer, who at very short notice was at liberty to withdraw his custom, but when that happened there would doubtless be an enormous private demand for commercial vehicles. In the meantime users had been compelled to form fresh connections with manufacturers in other countries, who had been at liberty to develop their models to suit the public demand, whereas national needs had confined this company to one model only, their fire engine alone excepted. The Americans, who would be their chief competitors, have as a basis a huge protected market, and they were no longer under the disadvantage of such a disparity in wages as existed a few years ago. Nevertheless, the directors had full confidence in their ability to find adequate outlets for the company's increased production.

Mr. H. R. Dennis (a managing director), in seconding, said that a year ago he expressed the hope that the increased output from the extensions would counteract the ever-increasing expense of material and labour, and although the extensions were not all completed, this forecast had come true. They had not charged the Government more for their manufacture; the price charged to-day was the same as at the outbreak of war, and all the increased expenses had been met by labour-saving appliances and a greater output. The fire engine department had shown its relative proportion in the increased output. The Dennis turbine engine stood pre-eminent of all fire-fighting appliances. It protected against fire the principal cities of the world and played a great part in protecting life and property against incendiary bombs. It was very pleasing for the directors to look back for the past three years and say that they had had no trouble with their workpeople.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Thursday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BOLTON.

Electricity Department.

The Electricity Committee of the Bolton Corporation invite tenders for the supply, delivery and erection of the following plant at their Generating Station, Back-o'-th-Bank, Bolton:—

One 7,500-kw. Turbo-Alternator with Condensing Plant.

Specification and form of tender may be obtained from Mr. W. J. H. Wood, Borough Electrical Engineer, Back-o'-th-Bank, Bolton, on receipt of a deposit of one guinea, which deposit will be returned on receipt of a *bona fide* tender.

Sealed tenders on the prescribed form, endorsed "Tender for Turbo-Alternator," must be delivered to me not later than 12 o'clock noon, January 15, 1918, addressed to the Chairman of the Electricity Committee.

The acceptance of any tender will be subject to the sanction of the Local Government Board being obtained for the necessary loan.

The Corporation do not bind themselves to accept the lowest or any tender.

Town Hall, Bolton, December 1917. — SAMUEL PARKER, Town Clerk.

POSITIONS VACANT.

NIGERIAN GOVERNMENT RAILWAY.

Assistant Locomotive Superintendents.

Assistant Locomotive Superintendents required for the Nigerian Government Railway for Two Tours, with possible extension. Salary, £300—£10—£350, and a war bonus in certain circumstances. Free quarters and first-class passages. Liberal leave in England on full salary. Candidates, age between 25 and 45, with experience in Running Sheds and Drawing Office, should apply at once (by letter) to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1. Men engaged on Government work, or eligible for military service, need not apply.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

Appointment of Traffic Superintendent in Tramways Department.

Applications are invited for the position of Traffic Superintendent of the Walthamstow Council Tramways, at a salary of £150 per annum, with a maximum of £200 per annum, without War Bonus.

Applicants must have had practical experience in the regulation and control of tramway traffic, and a thorough knowledge of electric car equipment.

A schedule of the duties attached to the office may be obtained on application to Mr. William Murray, A.I.E.E., Tramways Manager, Chingford Road, Walthamstow.

Applications in the candidate's own handwriting, stating age and past experience, and accompanied by copies of three recent testimonials, should be delivered by post only, to the undersigned, endorsed "Traffic Superintendent," not later than 5 p.m., on Friday, the 28th day of December, 1917.

Town Hall, Walthamstow, December 12, 1917. — C. SYDNEY WATSON, Clerk of the Council.

ASSISTANT ENGINEER WANTED.

The Bootle Corporation are desirous of receiving applications for the post of Assistant Engineer for their generating station and sub-stations. Applicants should have good technical training and experience with the operation of modern E.H.T. plant and rotary converters, and preferably some drawing office and workshop experience.

Applications, enclosing copies of not more than three recent testimonials, and stating briefly training, experience, age, and salary required, should be addressed to the

Pine Grove, Bootle, Lancs. — BOROUGH ELECTRICAL ENGINEER.

COUNTY BOROUGH OF STOCKPORT.

Electricity Department.

Wanted, Junior Shift Engineer; one having both A.C. and D.C. experience preferred.

Wages £2 12s. per week, including war bonus.

Applications to be addressed to the undersigned, and delivered to this office at once.

Electricity Offices, Millgate, Stockport. — R. LOMAX.

THE STALYBRIDGE, HYDE, MOSSLEY AND DUKINFIELD TRAMWAYS AND ELECTRICITY BOARD.

Station Superintendent.

The above Board invite applications for the appointment of Station Superintendent.

Applications, stating age, full details of experience, and salary required, to be endorsed, "Station Superintendent," and addressed to ENGINEER-IN-CHIEF, Generating Station, Tame Valley, Stalybridge.

SWITCHBOARD ATTENDANT.

Switchboard Attendant wanted for Certified Undertaking, experienced in E.H.T. and D.C. three-wire work. Wages 35s. per 56-hour week, plus war bonus of 14s. per week.

State age, training and experience, also when able to commence duties, and enclose recent testimonial, to

Generating Station, Back-o'-th'-Bank, Bolton. — THE BOROUGH ELECTRICAL ENGINEER.

SCRAP IRON AND METAL.

S. D. HARRISON, WHOLESALE SCRAP IRON AND METAL MERCHANT, of Queen's Road, Great Yarmouth, who recently purchased contents of the sheds destroyed by fire owned by the Dartford Light Railway, has disposed of all the useful material to the Urban District Council of Bexley Electricity and Tramway Department, Broadway, Bexley Heath, Kent. Any firms interested in any of the parts can communicate with them.

Any firms having Old Buildings, Machinery, Engines, Boilers and Plant, etc., for disposal, please communicate with S. D. HARRISON who has capable men to carry out all classes of demolition work. Distance no object. Terms: Cash. Established 1891. Telephone: 286, Great Yarmouth. Telegrams: "Metallic," Great Yarmouth.

Electric Tramcar Handbook

FOR MOTORMEN, INSPECTORS, AND DEPOT WORKERS.

By W. A. AGNEW.

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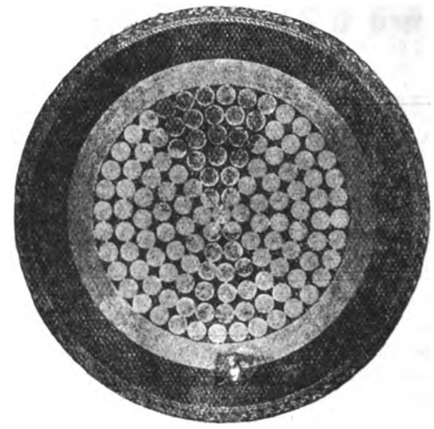

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SATURDAY, DECEMBER 15, 1917.

THE ABOLITION OF HALF-PENNY FARES.

IT is certainly surprising to find that a majority of the municipal representatives of practical people like those of Leeds have decided against the suspension of half-penny tramway fares. London and a number of other towns which had half-penny fares have been driven by the circumstances of the time to see that if the tramways are to be used as fully as possible for the most essential purposes these short stages must be abolished. The longer-distance journeys on tramways are a necessity for enormous numbers of people, munition workers and others; the short journeys for which a half-penny is charged are a luxury, and the lowest fare can be abolished without causing material inconvenience to anyone. The length of a half-penny stage can be walked in the ordinary way in about ten minutes, and those who do not wish to walk it may well be called on to pay a penny. The thing that has to be done, if possible, is to find accommodation in the cars for all the passengers who wish to travel for longer distances than a half-penny stage. In Leeds, as in other towns where "half-penny conditions" have prevailed, the experience has been that large numbers of would-be long-distance passengers are unable to find room in the cars owing to the large number of half-penny passengers. It is at present impossible to get additional cars, and if they could be got it would probably be impossible to find drivers for them. The natural step, accordingly, to relieve congestion and to give the long-distance passengers a better chance is to do away with the half-penny fares. This would inevitably cause a reduction in the number of short-distance passengers, but an increase in those travelling longer distances. From a money point of view the change has been successful in other towns, and, though Leeds tramways have hitherto been very prosperous financially, less happy days may be approaching. A prospective increase of wages to meet the increased cost of living is to require £76,000, and the arrears of maintenance and renewal work are mounting up. Through the suspension of that work as far as possible, owing to war conditions, the expenses have been lower and the gross surplus has been higher than they should have been. That means that a day of reckoning is coming. But, even apart from the financial aspect, it is the duty of every tramway authority to make the undertaking as efficient as possible in helping with war work. To do that, all war workers desiring to use the tramways for distances of over a mile should be provided with accommodation in the cars. Their demands are growing; and the remedy is to abolish the half-penny fare. The protest made at the meeting of Leeds Town Council in favour of retaining these fares ignored the fact that there is no hardship nor material loss of time in walking the distance of a half-penny stage. The arguments of Alderman Smithson, chairman of the Tramways Committee, in favour of the abolition, were quite unanswerable; but the Council decided by 27 votes to 22 to retain the half-penny fares. The majority was not large, and perhaps some of the Labour members who formed part of it will have their eyes opened by their constituents who find it difficult, or impossible, to get room in cars when going to and returning from work over distances ranging up to, perhaps, three miles or more. If the Tramways Committee bring up the proposal at some future time it may have a different fate because as time goes on the situation with the present fares will always be growing more difficult.

LONDON COUNTY COUNCIL TRAMWAY MATTERS.

OPPOSITION TO ROADSIDE PETROL SUPPLY.

At the fortnightly meeting of the Council on Tuesday, the General Purposes Committee reported upon a letter that the Commissioner of Police of the Metropolis had addressed to various road authorities in the police district on the subject of the supply to motor vehicles of fuel, water, power, etc., from mechanical fittings in the public highway. The Commissioner drew attention to the fact that after the war motor traffic, especially the heavy variety, will increase in volume. He also stated that owners of steam wagons have for some time past been agitating for roadside supplies of water, and that advertisements are now appearing for installations for the supply of petrol by flexible hose from a standpipe on the footway. Power for electric trucks can also be similarly supplied, and attempts are being made to secure permission from local authorities to charge vehicles from plugs by the roadside. Applications for similar facilities in connection with the recently introduced running of petrol engines on coal gas are also anticipated. While inviting the views of the various authorities in the Metropolitan police district the Commissioner expressed the opinion that from the traffic point of view there is great objection to the adoption of the proposal unless the places of supply are selected after the most careful consideration. The proposal has been considered by several committees.

The Fire Brigade Committee are of opinion that the adoption of the scheme would have very little effect, if any, on the services under their control.

The Highways Committee consider that the proposals are open to the following objections :—

(1) Motor vehicles waiting at supply points along tramway routes would compel slow-moving traffic to move on to the tramway tracks, thus causing obstruction to fast traffic and greatly increasing risk of accident.

(2) The standing of motor vehicles, especially in the case of large vans, pantechnicons, etc., would obscure the view of pedestrians crossing the road, and would be a fruitful cause of accidents.

(3) Any supply points situated near tramway stopping places would obstruct and cause danger to pedestrians entering or leaving the tramcars.

(4) The width of footway in many thoroughfares is already so narrow that pedestrians overflow into the carriageways and the adoption of the proposed scheme would increase the danger arising on this account.

The Public Control Committee are strongly of opinion that it is undesirable to permit an innovation of this kind, in view of the fact that in many parts of London traffic is congested and the roads are narrow. Serious danger might arise from the accidental ignition of any spirit which was spilled. The Committee suggested the adoption of a hard and fast rule that in centres of population the trade in the supply of petrol should be conducted on the dealer's premises.

In view of the opinions expressed by the Committees and that the case for such roadside provision does not appear to be adequately established, the Council adopted the advice of the General Purposes Committee declining to allow any of the facilities.

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WAGES OF WOMEN OF CENTRAL CAR REPAIR DEPOT.

The Rolling Stock Conciliation Board on November 10 arrived at an agreement providing that women at the central car repair depot be paid minimum wages of 24s. a week, with 5s. a week war wages. This decision is limited to women 21 years of age and over, as the Conciliation Board's scheme does not apply to persons under 21 years of age. The Highways Committee recommended that the wages of women between 18 and 21 years of age at the repair depot should be the same as those fixed by the Conciliation Board agreement for women of 21 years and over, and this was approved by the Council.

CROWDING AT VICTORIA TERMINUS.

Mr. A. H. Scott, on behalf of Mr. G. S. Hume, chairman of the Highways Committee, in reply to a question by Mr. Gilbert, said that a very large staff had been provided to deal with the crowds entering the cars at Victoria terminus during the rush hours. The demand for cars was such that it was not practicable to turn cars at intermediate points during the busy period of the evening. If sufficient men and cars were available, the suggestion that cars should be turned could be carried into effect.

CHRISTMAS HOLIDAY DEMAND.

References to the threat of Manchester tramway employees to cease work on Christmas Day if they are not conceded a holiday were made at a meeting of the Corporation on December 5. Alderman Bowes, chairman of the Tramways Committee, condemned the action of the men as very high-handed. The committee had refused their request, and he hoped that the employees would not forget that last year a similar application was arbitrated upon by Sir George Askwith, who decided against it. Last Christmas Day the cars carried nearly 500,000 passengers, so that if the employees ceased work great hardships would be caused to a very large number of persons. He hoped that the employees would see their way to work a Sunday service as was done last year, and then only one thousand of the staff would have to do duty for a portion of the day.

Alderman Linsley, chairman of Salford Tramways Committee, has informed the Council that the committee had refused the employees' request for a day's holiday with pay on Christmas Day. The manager was negotiating with the union, and the committee hoped that some sort of a service would be arranged.

Blackburn Tramways Committee have refused an application by the local branch of the Association of Tramway and Vehicle Workers for a Christmas Day holiday for all employees.

In order to assist Sunderland Tramways Committee to arrive at a decision on the application of their employees for a holiday, a list has been published of tramways upon which the cars will not run on Christmas Day. Among the number are Bradford, Birmingham, Bexley (London), Bournemouth, Burton-on-Trent, Coventry, Cardiff, Chester, Derby, Erith (London), Gloucester, Halifax, Keighley, Newport, Northampton, Nottingham, Oldham, Portsmouth, Rochdale, Worcester, and York. As the names of Manchester and Salford are given in the list which has been brought to our notice, it would appear that the compiler has regarded threats of the employees to cease work as an indication that the cars will not run. In the two places named the matter is still a subject of negotiation. As regards York the position on December 4 is given in a statement to the Corporation by Alderman Meyer, chairman of the Tramways Committee, that he hoped to obtain the consent of that body to no service being run on the day.

At Leith the Employees' Union on December 5 asked for the New Year's Day holiday to be settled finally by the Tramways Committee alone, as they feared disapproval by the Town Council, as had happened before to a recommendation by the Committee. The union employees have decided not to run the cars, and in the event of non-union labour doing so they threaten to strike until every employee is compelled to join that association.

Leeds Tramways employees have not made any request to the Tramway Committee to discontinue the service on Christmas Day, as was reported in our last issue. The usual service will be run, the schedule being the same as on Sundays.

REVISION OF FARES AND STAGES.

At the December meeting of Leeds Corporation, Alderman R. A. Smithson, chairman of the Tramways Committee, moved the adoption of a recommendation for the suspension of halfpenny fares, excepting in certain cases, for the period of the war. He stated that the reason for the proposal was mainly the congested traffic, caused by insufficient cars and the impossibility of adding to the number under present conditions. The Committee were not condemning the principle of halfpenny fares—in fact, they were looked upon as being a nice addition to the revenue at very small cost, but these were not normal times. The number of halfpenny passengers had grown enormously, with the result that the longer-distance passengers were crowded out. Observation showed that from crowded cars an average of from sixteen to eighteen passengers alighted at the first halfpenny stage. Although the receipts had greatly increased, the extra revenue was being absorbed by increased expenditure. It must also be remembered the tramways were doing nothing in the way of renewals; for two years now the department had not been able to buy a yard of rails. This was the first alteration in the fares which had been proposed after three years of war, whereas in other cities changes had taken place. It might be his unpleasant duty subsequently to submit proposals of further increases in fares, but he hoped the present suggestion would postpone that for a time. Councillor Connellan moved that the question be referred back. It sounded strange to hear Alderman Smithson complain of a shortage of cars when it was suggested only a few months ago that cars should be lent to a neighbouring corporation. If halfpenny fares were suspended, people would be prevented from getting home to their meals. Councillor Hinchliffe, in supporting the recommendation, gave some figures showing the number of halfpenny fares collected weekly on some of the routes. On Dewsbury Road and Beckett Street route the number was 54,000; Woodhouse Street and Beckett Street route, 42,000; Cardigan Road and Balm Road, 21,000; Lower Wortley route, 25,000; Upper Wortley and Halton route, 36,000; Guiseley route, 45,000, and Lawnswood route, 39,000. Alderman Wilson, in supporting the report, said that it would be his duty at a later stage to ask the Council to agree to an increased war bonus to employees, which would amount in the aggregate to £76,752. Under the scheme of control of material and labour by the Committee set up by the Board of Trade, it might be that on some of the sections double lines would have to be taken up and made into single lines. It might be, indeed, that some of the sections would have to be wiped out altogether. After considerable discussion, the recommendation to abolish the halfpenny fares was referred back to the Tramways Committee.

In order to avert a threatened loss on the tramways undertaking due to increased working costs, Manchester Corporation, on December 5, accepted the recommendation of the Tramway Committee to shorten the penny stages by 640 yards, thus returning to the scale in operation in 1913. The average distance a passenger will be able to travel for a penny on the main routes under the new scale is two miles 750 yards. The Tramways Committee's recommendation gave rise to a lively debate, and an amendment to refer the proposal back was defeated. Councillor A. Taylor declared that the permanent way and the cars were in a serious condition on account of the impossibility of obtaining sufficient materials.

Keighley Council have agreed to the Tramways Committee's proposal to increase the railless car fares.

WAGES OF EMPLOYEES.

Tramway employees throughout Lancashire and Cheshire intend to apply for a further war bonus of 10s. a week. It is stated that the application will be made on behalf of all sections of tramway workers. Male employees over 18 years of age have already received war bonuses amounting in the aggregate to 12s. per week on the pre-war scale of wages, women employees have received 9s., and boys and girls under 18 years of age, 4s. 6d.

Alderman Sir John Courtis presided at a meeting of the Cardiff Corporation Wages Committee on December 7. Although the proceedings were private, it is reported that an application was received from the members of the Cardiff branch of the Tramway and Vehicle Workers' Association, which numbers about 500 and includes drivers, conductors, pointsmen, etc., for an increase in wages sufficient to bring their pay up to 75 per cent. above the pre-war rates. This will represent an additional maximum increase of about 20s. The increase already received amounts to 9s. per week. The week's work consists of 54 hours.

Leeds Corporation have increased the war bonus to their employees to 15s. a week to male adults, and 12s. to women.

Nottingham Corporation workmen, including the tramway employees, have accepted the award of the Committee on Production, as it would not preclude them from making a further application. Mr. Hirst, general secretary of the Tramway and Vehicle Workers, at a mass meeting of the workmen of the various departments, stated that Nottingham was considerably behind many of the larger municipal bodies.

Concessions to tramway employees have been either made or recommended at Bournemouth, Cheltenham, and Keighley. At the latter place the increased cost in wages and material amounts to £3,828 on a total revenue of £10,000, and the chairman of the Tramways Committee has stated that the Committee may have to ask for a grant from the rates, as the fares are practically at the maximum.

The Traffic Sub-Committee of Newcastle tramways have considered the application of drivers and conductors for an increase of 5s. a week, and 2s. 6d. a week for women and boys, but no decision has been reached.

THE NATIONAL TRAMWAY COMMITTEE.

The new committee which is to provide labour and materials for the continuation of essential tramway services, is to be officially known as the Tramways (Board of Trade) Committee. The first meetings have been held and the terms of reference have been received. Offices will shortly be selected and a secretary will be appointed.

It is understood that a deputation from Scotland will be received at the Board of Trade next week to urge the claims of Scottish tramways to representation on the committee. The view generally taken in the North is that Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, and Major Coutts, general manager of the Paisley District Tramways Company, should be added to the committee.

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MISCELLANEOUS NEWS AND NOTES.

Our Next Issue.—Owing to the Christmas holidays our next issue will go to press on Thursday, and all communications intended for that issue should be received by the first post on that day.

Lossiemouth Town Council have instructed the clerk to make inquiries as to the cost and capability of an electric motor lorry.

Motor Fire Engine for West Bromwich.—West Bromwich Town Council are applying for sanction to borrow £1,000 for the purchase of a motor fire engine.

The Glasgow Tramway Accident.—A third death has occurred as the result of the overturning of a Glasgow tramcar reported in our last issue. The majority of the injured passengers are making good progress toward recovery.

Electricity Works Extension.—Burton-on-Trent Corporation have a scheme under consideration for the extension of the electricity works at an estimated cost of £42,200. The extensions will include a turbo-alternator, boilers, switchgear, etc.

Irish Tramways Not Controlled.—One of our contemporaries, which was "horrified to learn that Ireland was not represented on the tramways control committee" may be relieved to know that the committee's reference does not extend to Ireland.

Inspectors and a Union. — Blackburn Tramways Committee have refused a request by the Tramways Inspectors and Tramways Workers' Association that the inspectors on their tramways shall have the right to join that association if they so desire.

Increased Charge for Energy at Walsall.—The Tramways Committee do not consider it reasonable that they should be called upon to pay a further increased charge of 20 per cent. for electrical energy, and the Electricity Committee is to be informed accordingly.

Private Bills.—Plans for Private Bills and Provisional Orders for the Session 1918 number 50, as against 30 last Session. Provisional Orders number 28, compared with 17. There are very few tramway projects, but electricity extension schemes are numerous.

Tramcar and War Bonds.—In the absence of a "tank," something else which is peripatetic in its nature seems to be capable of specially attracting the public to invest in war bonds. Birkenhead Corporation have used a tramcar as a bank for the purpose with great effect. Other towns may follow suit.

Conductor Awarded Damages.—A Belfast conductor has been awarded £25 damages against a passenger who complained to an inspector that he was drunk and incapable of performing his duties. Plaintiff had asked the defendant for the fare when he was going up the stairs of a car, defendant replying that he could go upstairs and get it.

Track Depreciation.—At a meeting of the Burnley Council recently, Councillor Grey said that the wearing away of the tramway rails was a very serious matter, for which no provision was being made. This would some day confront them with a problem of the greatest financial difficulty, and he did not think that due consideration had been given to the matter.

Vertical Spindle Induction Motors.—The British Thomson-Houston Company have issued list No. 2180, describing vertical spindle induction motors. The individual driving of machines is often the most convenient and economical method of operation, but in many cases power is lost by the adoption of horizontal motors for vertical machines. Such cases can be dealt with conveniently by motors with vertical spindles for direct driving, and full particulars of machines of this type are given with illustrations in this 20-page pamphlet.

Illegal Stopping of a Car.—A passenger was recently summoned for interfering with a trolley pole on one of the Birkenhead Corporation cars. He said, in defence, that he asked the conductress to stop. As she did not do so, he pulled the trolley from the wire, thus stopping the car, and got out. The defendant had apologised, and the case was dismissed on payment of costs.

Coal Gas Supply to Motor Vehicles.—Wandsworth Borough Council has given permission to the local gas company to fit up an arrangement at the gas works which can be swung over a boundary wall and make connection with the filling device on motor vehicles standing at the kerb side. The arrangement will not interfere in any way with pedestrians, and when not in use it will be swung back on to the company's premises.

Belfast Generating Station.—As a consequence of a third stoppage of a turbo-generator, the Belfast Tramways and Electricity Committee have consulted Sir John Snell as to the provision of additional plant. The chairman has expressed the opinion that the machinery is obsolete, and he considers that the only remedy is a new station at the water's edge of sufficient capacity to meet the requirements for the next quarter of a century.

Are Soldiers Workmen?—At the West Riding County Court at Wakefield on December 4, Robert Brown, a corporal in the Royal Defence Corps, employed as one of the guardians at Lofthouse Park internment camp, was summoned by the Yorkshire (West Riding) Electric Tramways Company for having refused to pay the legal fare. Mr. A. D. Smith, who prosecuted, said until recently the tramway company allowed soldiers to travel on the cars at half-fare, but owing to a variety of causes, including the gradually increasing number of soldiers, the company withdrew this concession. Defendant maintained that he and others, although they were in khaki, were entitled to travel on the cars at the same rate as workmen. The Chairman said the case was a very important one, and the Bench adjourned the case for a week in order to see the Act of Parliament governing workmen's fares and its definition of workmen.

Manchester Car Runs Back.—Five persons were injured as the result of a collision between two cars in Princess Street, Manchester, on December 6. A double-decked car was being restarted from the compulsory stop at the junction with Whitworth Street, when the wheels failed to grip and the car started to run backwards down the hill. Although the driver applied the electric brake it failed to be effective, and the car collided at the bottom with a stationary car.

The Result of Inferior Coal.—In reference to a decrease in the number of units generated concurrently with a large increase in the amount of coal consumed, Alderman Meyer, chairman of York Electricity and Tramways Committee, has pointed out that it is largely due to the inferior class of coal the manager had to take nowadays. It was a very serious matter. The consumption per unit had gone up from 3·83 to 4·79, and there was no remedy for it.

Compensation and Soldier Passengers.—Halifax Trades Council have passed a resolution protesting against the treatment of soldiers injured in a recent car accident. The mover said that while a tradesman could get £76 compensation, the soldiers were offered mere acknowledgments. He admitted that soldiers were debarred from accepting compensation, but he contended that such a course was not right, and that such abnormal conditions ought to be opposed.

British Oil Supplies.—In the House of Commons, on December 10, Sir J. D. Rees asked the President of the Board of Trade whether the Government had under consideration the desirability of forming an all-British oil company, free from all foreign interest and foreign control, for dealing with the development of oilfields outside the British Isles and particularly in British Colonies, Dependencies and Allied countries. Sir Albert Stanley: The whole of this question is under consideration.

Boys' Dangerous Pranks.—At Croydon Police Court on December 6, two boys were summoned for jumping on the backs of tramcars. Mr. A. V. Mason, general manager of the South Metropolitan Electric Tramways Company, said that they had been much troubled with such boys, who jumped on the cars, rang the bell, and gave the emergency signal, as a result of which the drivers applied the emergency brake, and brought the car up so suddenly as to shake up the passengers. The boys also stole boxes in which the conductors kept their coppers. Each boy was fined 5s.

Directors' Decision Preferred to Arbitration.—Rather than undergo a repetition of the disappointment engendered by the last Government arbitration upon their request for improved conditions, the employees of Edinburgh Tramways Company have accepted the granting by the directors of a minimum list of demands. The free passes have also been returned. The present war bonus of 5s. per week is to be converted into an increase of wages of 1¼d. per hour for male employees, and ¼d. per hour for women. Employees paid a weekly wage will have the war bonus converted into an increase of 6s. per week.

Six-Day Week and Eight-Hour Day Demand.—A forty-eight-hour week, free car rides, and payment at the rate of time and a quarter when called to work on holidays, are demands which the employees in the Manchester and Salford Corporation tramways car works and electricity department are making. At the other end of the scale, Kirkcaldy Council have refused a request by the tramway and electricity workmen for reduction of hours from 60 to 54, and payment of time and a half for overtime. At the same time the charge for energy has been increased by another 25 per cent., making 50 per cent. since the outbreak of the war.

Prevention of Expectoration.—It is time that the disgusting and hygienically dangerous practice of spitting in railway and tramway cars should be dealt with more energetically than has been done hitherto. Two methods of preventing spitting by smokers on tramway cars are by prosecution and by a health campaign. The latter may be best accomplished at this period by the co-operation of tramway departments with that of the medical officers of health. It is reported that the tramway manager in a provincial town successfully dealt with the trouble by the following pointed notice: "If you expect to rank as gentlemen, do not expectorate in this car."

Hull Improvements.—The Corporation City Improvements Committee have conferred with the East Riding County Council as to the proposals for the widening of Hedon Road to a width of 70 ft. from the city boundary to the Preston Road. The length affected is about 2,685 yards, and the improvement will require the purchase of about ten acres, the cost of the land being estimated at £2,500. As approximately two-fifths of the land required to widen the road will be utilised for tramway purposes, it is proposed that the Tramways Committee should contribute £1,000 to the cost of the widening. The County Council has agreed to contribute £1,000.

A Result of Careless Driving.—In Dumbarton Sheriff Court, Sheriff Macdiarmid has given his decision in an action by the Anglo-Swedish Electric Welding Company, Glasgow, against the Dumbarton Burgh and County Tramways Company. It appeared that a motor lorry belonging to the pursuers was going along a road in which the tramway was laid, when the engine went wrong and the lorry came to a standstill in such a position that part of it projected over the tramway line. While men were engaged repairing the engine, a tramcar ran into the lorry and both vehicles were damaged. The pursuers claimed £302. The Sheriff found that the collision was due to the fault of the driver of the tramcar, and assessed the damages due to the pursuers at £266.

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A German View of the Position.—A Reuter's telegram from Amsterdam, published in the *Times*, gives a summary of a speech by Dr. Walter Rathenau, at the annual meeting of the A.E.G. in Berlin, in which he said: "The war has entered the state of liquidation. The climax is past. The British thought that the war could be regarded as only a sum in arithmetic, and that in a given period an entirely isolated country must have exhausted its war supplies and be forced to give up the war; but no material exhaustion is to be feared in Germany. Human and moral factors, resolution, organising will and self-confidence, are stronger factors than mechanical powers. Lord Lansdowne's letter displays the re-awakening of a spirit of soberness and moderation. Our foreign affairs are in strong hands which we trust, and I hope that the political liquidation will be ended so that an enduring peace may be assured."

Rotherham Tramways' Appeal for Men.—An application was made to the South Yorkshire Tribunal on December 7 for seven employees, including five motormen, of the Rotherham Corporation Tramways. The chairman said it was impossible for the cars to be driven by women, but women acted as conductors, except in the case of trackless cars. In addition to the ordinary service, fifty cars for munition workers were being run. Before the war the passengers carried numbered 9,800,000 a year; now they would total 20,000,000. Thirty substitutes had been trained, but only ten were capable of doing the work, and they only filled the places of men who had left to go to better positions. If the men on the list were taken it would probably mean a decrease of cars for munition workers. Since August 31 last there had been forty-three collisions, in thirty-six of which the cars were driven by substitutes. The appeal was disallowed in the case of four men, and the other three were given exemption until March 31.

Traffic Difficulties.—Brighton Tramways Committee are considering the advisability of discontinuing the running of late cars and of reducing the services generally, consequent upon the shortage of motormen. The manager has appealed to the places of entertainment to close at an earlier hour, and to the general public not to use the cars during the hours of pressure caused by workers going to and returning from business. Although faced with an insufficiency of motormen, the manager of Grimsby Tramways Company has been pressed by the Highways Committee to improve the service. By employing more women as conductors, Mr. White has prepared a list of improvements which has thoroughly satisfied the Committee. In return, Mr. White has asked them to assist him in obtaining sanction for larger headlights, and to run cars over Bargate later than 7 p.m., or, as an alternative, two small motor omnibuses. The manager has also agreed to double the line in Hainton Avenue, from Hainton Square to Pasture Street, and to put in a new crossing place between Hainton Square and Cobden Street, so that the cars can be kept continually running.

Railless Cars for Halifax.—Sanction was given at the last Town Council meeting to the purchase of two railless cars from Dundee Corporation at a price of £650 each. Alderman Brooksbank protested that they had no information as to the cost of the equipment, or as to the damage done by railless cars to the highways. In Halifax the cost of road maintenance was £140 per mile per annum. Where these cars had been used in Dundee he understood that the cost had amounted to £600. Alderman Spencer said that the cars would keep heavy loads off the roads. No special overhead wires would be adopted for the equipment. The cars would be able to carry loads of five tons at a cost of from 9d. to 11d., representing a cost of about 2¼d. per ton per mile. Petrol driven vehicles would represent a cost of about three times that amount. He believed that the railless cars, apart from saving the roads, would be one of the most important means of carrying goods in the future. In the national interest, something must be done to relieve the roads of carrying heavy loads and for carrying goods more economically. After the war there would have to be general legislation dealing with goods carriage. What the Tramways Committee wished to do was to assist the Goverment in taking heavy materials off the roads.

Inquiry into Glasgow Tramway Accident.—Colonel Pringle, chief inspector of the Board of Trade, opened an inquiry on Thursday into the accident which occurred at Victoria Road on Wednesday, December 5, resulting in three deaths, and injury to forty persons. James Grierson, tramways engineer, David Brown, rolling-stock superintendent, and Samuel Morrison, chief time clerk, and James Carnegie, the motorman, gave evidence. The latter stated that he was 16 years and 5 months old, and that he entered the Corporation's service about September last. He was first a conductor, and six weeks after went up to the motor school. He was about a week under instruction there, and was subsequently fourteen days with a driver on the road learning to drive, and receiving further instruction. After thirty days' probation he was passed on the Saturday preceding the accident. In answer to Colonel Pringle, he said he thought the accident was caused by too high speed at the curve, and he was not aware he was near the curve until he was actually on it. James Gardiner, chief instructor of the tramways department, said that all motormen were instructed that by the Board of Trade regulations the maximum speed on all curves was four miles an hour. Mr. L. Mackinnon, traffic superintendent, said that about three months ago as an experiment they started employing lads about 16 years of age, and they had now 146 lads under 18 years of age under training, of whom 49 were qualified, 46 were training, and 51 were conductors.

PERSONAL.

Mr. J. C. Williams, electrical engineer and tramways manager of Erith, has been voted an increase in salary.

Mr. H. S. Ellis, electrical engineer of South Shields Corporation power station, has been granted an increase of £50 in salary.

Mr. J. B. Hudson, deputy electrical engineer of Bootle, has been appointed electrical engineer to Leigh Corporation. There were 111 applicants for the position.

Mr. W. S. Vignoles, borough electrical engineer, of Grimsby, has been gazetted lieutenant-colonel. Mr. Vignoles offered his services at the outbreak of war, and went to France in 1916.

Mr. A. P. Trotter will deliver his presidential address to the Illuminating Engineering Society on Friday, December 21, at the Royal Society of Arts, John Street, Adelphi, W.C., at 5 p.m.

Mr. William H. Woods has been appointed as from November 21, 1917, a charge shift engineer at Greenwich generating station at a commencing salary of £250 a year, rising by annual increments of £10 to £300.

Mr. A. T. Smith, borough electrical engineer of Leigh Corporation, has been presented with a gold wristlet watch as a token of respect and appreciation by the staff of the electricity works on his appointment to the British Dyes Company, of Huddersfield.

Mr. F. J. S. Hosken, general manager and engineer of Darwen Corporation Tramways, has been granted permission to accept an appointment as assistant dilutions officer under the Ministry of Munitions at Manchester. Mr. Hosken will retain his position as manager of the tramways department, but will devote a portion of his time to his new duties.

The Staff of Cape Electric Tramways.—Reference was made by the chairman of the Company, at the annual meeting, to the difficulty created by the ever-recurring changes among the employees. All the new hands required to be trained, and great credit was due to Mr. W. F. Long, their able general manager, and the staff in Cape Town for the efficient manner in which the service had been conducted. The Port Elizabeth Tramways, under Mr. W. H. Freemantle's able management, did not suffer so much from these disabilities, and had run quite smoothly throughout.

Inspector J. F. McGovern, of Colchester Corporation Tramways, and Regimental-Sergeant-Major of the Essex Yeomanry, has been appointed Lieutenant and Quartermaster of the 18th (Queen Mary's Own) Hussars, and has proceeded overseas to join that regiment. Prior to being R.S.M., Lieut. McGovern was Regimental-Quartermaster-Sergt. of the Essex Yeomanry. Soon after the outbreak of the war he re-enlisted, and has gained the highest praise from his superiors. Recently he received special mention from the G.O.C. 1st Mounted Division. During the South African War Lieut. McGovern served as Staff-Sergeant in the City Imperial Volunteers, and was mentioned for his services.

Mr. J. M. McElroy, owing to his appointment to the Tramways (Board of Trade) Committee, has relinquished his duties at the Admiralty Shipyard Labour Department. The Manchester Corporation Tramways Committee, on December 11, sanctioned the change, and gave their general manager full liberty to devote his attention to the important work which awaits the new committee.

Sir Arthur Stanley has intimated to the Ormskirk Divisional Conservative Council that he does not intend to seek re-election at the general election. In his letter he said that new problems of great magnitude were arising which must be dealt with by Parliament in the near future, and such an important division should have a more active and efficient representative. In view of the invaluable and untiring services which Sir Arthur Stanley has given since the beginning of the war as head of the Red Cross organisation, the suggestion that Ormskirk division might find a more active or efficient representative is a counsel of perfection which is not likely to be realised.

Mr. J. D. S. Moffet, general manager, Belfast Corporation Tramways, and **Mr. McCormick,** the city solicitor, were warmly commended by Alderman Tyrrell, chairman of the Tramways Committee, in reference to the recent arbitration by the Committee of Production. Alderman Tyrrell said that the inquiry arose out of the action of the Electrical Trades Union in connection with the transfer of overhead equipment maintenance to the tramways department. The principle was—whether the Corporation had the right to direct their own policy, and institute a scheme of retrenchment and

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DEPRECIATION & WASTING ASSETS

AND THEIR TREATMENT IN COMPUTING ANNUAL PROFIT AND LOSS

By P. D. LEAKE,

Fellow of the Institute of Chartered Accountants in England and Wales; Fellow of the Institute of Directors; Fellow of the Royal Statistical Society.

Particular attention is directed to a chapter on Depreciation and Controlled Establishments under the Munitions of War Act, 1915; and it may be added that the views of the Ministry of Munitions as to the proper treatment of Depreciation of Plant coincide with the views advocated in this work.

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efficiency, or whether an outside body had the right to veto that policy. Having regard to the importance of the principle that the Committee on Production had now definitely settled, the city solicitor was entitled to the thanks of the Corporation, and the same ought to be said of Mr. Moffet, because it was on his sound advice that the matter had its inception. Mr. Moffet's attitude had been vindicated up to the hilt, and the expectations which the Corporation had formed of his ability and judgment had been amply fulfilled. As the result of the new system, Mr. Moffet was maintaining the overhead equipment by a staff of about half of what was formerly employed, and was saving between £20 and £30 per week.

Mr. Ewing Matheson, who has died at Dartmouth at the age of 78, was chairman of Leeds Electricity Committee from 1905 to 1908. Upon the amalgamation with the Tramways Committee, he became vice-chairman, under Alderman R. A. Smithson, until 1910. Mr. Matheson was a leading civil engineer, and while acting as a director of Messrs. Handyside and Company, of Derby, he had charge of the erection of the railway stations at St. Pancras (London), St. Enoch's (Glasgow), and Manchester Central Station, the roofs of the Agricultural Hall and Olympia, and a large number of road and railway bridges in England, Europe, and the Colonies. Subsequently, he became principal of the firm of Messrs. Matheson and Grant, London, consulting engineers, and in 1887 he accepted the managing directorship of the Farnley Iron Company. He was the author of numerous engineering publications.

CONTRACTS AND ORDERS.

Brown Bayley's Steel Works, Ltd., have an order from Glasgow Tramways Committee for 500 steel tires.

The Carron Company have an order from Glasgow Tramways Committee for chilled iron brake blocks.

Lancaster Town Council have ordered two motor omnibus bodies from Mr. James Hardy, of Lancaster, at £245 each.

Bolton Electricity Committee have accepted the tender of Messrs. G. and J. Weir, Ltd., for a steam turbine feed pump.

Swansea Electricity Committee have recommended the acceptance of the tender of the British Thomson-Houston Company for plant required at the generating station at £25,516.

Walsall Orders Daimler Omnibuses.—Walsall Tramways Committee have authorised the manager to ask the Daimler Company to put the Corporation on its waiting list for the supply of six motor omnibuses at the close of the war, the price being subject to acceptance by the Committee at a later date.

Sheffield Electricity Committee have accepted a tender from A. Reyrolle and Company for thirty panels of E.H.T. sub-station switchgear; from Foster Brothers for pipe work for ash plant; from E. Bennis and Company for suction ash plant; and from R. White and Sons for lifts and rails for emergency power house.

FINANCIAL REPORTS AND MEETINGS.

L.C.C Traffic Receipts.—The traffic receipts for the week ended December 12 amounted to £54,212, an increase of £8,923, as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to December 12 (thirty-six and a half weeks) the total receipts were £2,034,579, an increase of £267,273, on the corresponding period of 1916.

Scarborough Central Tramway.—Alderman J. Pirie (chairman), at the annual meeting of the company on December 5, regretted that the board were not able to recommend even a small dividend. The reason was because of the arrears of repairs to plant and other uncertainties entailed by war conditions. Alderman Pirie, who has been associated with the company from its formation, and Councillor Gibson were re-elected directors.

Glasgow Tramway Costs.—The general manager of Glasgow Corporation tramways, Mr. James Dalrymple, has called the attention of the Tramways Committee to the financial position of the department which has resulted from the large increase in wages. The traffic receipts for the first six months of the present financial year show an increase of £80,472 in comparsion with the corresponding period of last year, but there has been a great rise in expenditure, due principally to higher wages.

Cape Electric Tramways.—Mr. L. Breitmeyer presided at the 21st ordinary meeting held on December 5, and moved the adoption of the report. From November last year, he said, the traffic receipts made up for the decrease experienced in the first four months of the financial year, and also enabled a considerable improvement to be shown. The number of passengers on Cape Town and Port Elizabeth systems was the highest on record, and reached 23,752,016 passengers, with a gross revenue of £231,105, or an increase of 1,274,650 passengers, and in receipts an increase of £18,314 over the preceding year. The working expenditure of £140,773 was also a record, and was greatly in excess of normal times, owing to the greatly increased cost of material, higher labour charges, war bonuses, etc., and lastly, the additional taxation imposed by the Union Government. The profits transferred, however, showed an improvement of £6,225. This result had been obtained under difficult conditions. In Cape Town, owing to an unusually dry season, a water famine was experienced, which necessitated the undue use of salt water for road watering, to the detriment of the rails. Fortunately, the storage capacity of their own tanks was sufficient to supply the water necessary for the boilers. There was a profit of £79,893, and after charging debenture interest and amortisation a net profit shown of £31,169; this, added to £7,983 brought forward, gave an available amount for appropriation of £39,152. £12,000 of this sum had been set aside to reserve account, and the directors recommended a dividend at the rate of 5 per cent. on the share capital, which would absorb £24,561, leaving £2,591 to be carried forward. It was most satisfactory that they had been able to increase the dividend. The English excess profits tax, amounting to £2,584, for which the company was made liable last year, was paid, and afterwards refunded. If any further shortage occurred in supplies the services might have to be reduced, but otherwise the outlook was satisfactory, thanks to the general prosperity of South Africa.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended December 1 give total receipts of £194,944 or £33,725 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £96 1s. 7d. per mile of single track, and last year at the rate of £79 9s. 2d., thus showing an increase for the week of £16 12s. 5d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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Cork Electric Tramways and Lighting Co., Ltd.
Isle of Thanet Electric Tramways Company, Ltd.
Keighley Corporation Tramways
Keighley Corporation Motor 'Buses
Burton-on-Trent Corporation Tramways
Scarborough Electric Tramways Co., Ltd.
Aberdeen Suburban Tramways Co.
Paisley & District Tramways Co.
Hastings & District Electric Tramways Co., Ltd.
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH Dec. 13 or previous.	A WEEK AGO
5%	5%	Alabama Traction 5% 1st Mt. .	—	67	68½	70
2/9	2/9	Anglo-Argentine 5% 1st Pref.	5	4⅞	55/7½	56/3
2/9	2/9	Do. 5% Cum. 2nd Pref. ..	5	4⅞	46/3	47/6
4%	4%	Do. 4% Deb.	100	91	70⅝	70⅝
4½%	4½%	Do. 4½% Deb.	100	98½	69⅝	70
5%	5%	Do. 5% Deb.	100	96	66½	66½
—	—	Associated Omnibus Co., Ord. ..	5/-		1/3	1/3
7d.	1/-	Auckland Elec. Trams. Ord. ..	1	1	20/-	20/3
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90½	90
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	101½	101½
—	1/-	Bath Electric Trams Pref. Ord.	1	½	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	11/-	11/-	11/-
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71⅞	71⅞
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77¼	77¼
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20¼	20¼
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	46	46
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	90½	90
4/-	4/-	Brisbane Elec. Trams. Ord. ..	5	7½	£6/15/9	£6/15/9
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	80/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	29½	29½
6%	5%	Do. Pref. Ord.	100	106	29½	29½
5%	5%	Do. 5% Cum. Pref. ..	100	103	42⅞	42⅞
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	82⅛	82⅛
4¼%	4¼%	Do. 4¼% Perp. Con. Deb.	100	96½	57¼	57⅛
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	32	32½
6%	6%	Do. 6% Cum. Part. Pref.	100	—	72½	75½
5%	5%	Do. 5% Deb.	100	92	77½	77½
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77⅞	65½	65⅜
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	73½	73
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref. ..	5	5½	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74	74
1/-*	1/-*	Cape Elec. Trams.	1		12/3	12/3
1/3	1/3	City of B. A. Trams	5	5½	80/-	82/6
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82	82
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10	10
—	—	Hastings & Dis. Elec. Tram Ord.	10/-		-/9	-/9
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1		9/3	9/3
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-		17/1½	17/1½
5%	5%	Do. 5% Deb. ..	100	87½	80½	80½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9⅛	9⅛
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	71
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9d.*	9d.*	Llandudno & Colwyn B. Ord. ..	1	—	10/-	10/-
—	1½d.	London & Sub. Traction Ord. ..	1		2/3½	2/6
6d.	6d.	Do. 5% Pref.	1		7/-	7/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81⅜	81⅜
5%	5%	Do. 5% Inc. Deb.	100	88½	80	80
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	35	36
3/-	3/-	Madras Elec. 6% Pref. ..	5	5	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%*	9½d.*	Manaos Trams & Ltg. Ord. ..	1		3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	71	71
$1⅛	$1⅛	Manila Elec. R. R. & Light .	$100	102	72	72
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1⅛	$1⅛	Mexico Trams. Common ..	$100	70	31	32
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	35	45
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. (1922)	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. ..	100	99	88½	89
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1		20/-	19/9
9d.*	9d.*	New General Traction	1		7/3	7/3
8d.	6d.	Northern Gen. Trans. Ord. ..	1		12/9½	12/9½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	78/1½	78/9
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	6/6	6/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/-	12/3
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1		6/3	6/4½
6d.	6d.	Do. 5% Pref.	1		11/9	11/4½
1/4	8d.	Provincial Trams. Ord. ..	1		20/3	19/9
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86¼	87¼
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	75¼	76
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	87	89
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74	74
12/-	10/-	Shanghai Elec. Cons.	10	13	14⅛	14⅛
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/7	4/7
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	91¼	94¼
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77⅛	77⅛
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	66
—	—	Yorks (W.R.) Elec. Trams. Ord.	5		18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5		84/7½	84/7½
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21¾	15⅛	15⅛
—	—	Undgd. Elec. Rys. of London ..	10	21½	33/1½	32/6
		Do. "A"	1/-		5/1½	5/6
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	103½	103½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	101½	102½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	81	81½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec
Aberdare U.D.C. ..	Dec. 4	393	455	+ 62	35	15,673	+ 1,384
Aberdeen Corporation ..	,, 5	1,882	2,146	+ 264	27	58,699	+ 6,543
Ayr Corporation ..	,, 8	256	331	+ 75	30	15,139	+ 1,644
Belfast City	,, 7	5,791	7,045	+ 1,254	36	232,773	+ 27,203
Birkenhead Corporation	,, 9	1,444	1,840	+ 396	36½	66,637	+ 10,256
Birmingham Corporation ..	,, 11	13,637	19,501	+ 5,864	35	644,343	+ 80,170
do. Motor Omnibuses ..	,, 1	1,022	1,179	+ 157	35	36,904	+ 1,335
Blackburn Corporation ..	,, 5	1,030	1,308	+ 278	36½	54,565	+ 8,504
Blackpool & Fleetwood ..	,, 8	267	362	+ 95	48	42,757	+ 775
Bournemouth Corporation	,, 12	1,759	2,180	+ 421	36¼	95,138	+ 8,451
Bradford Corporation ..	,, 8	5,982	7,384	+ 1,402	36	278,884	+ 30,651
Bristol	,, 7	4,383	5,339	+ 956	49	266,163	+ 26,161
Burnley Corporation ..	,, 8	1,502	1,844	+ 342	..	..	..
Burton-on-Trent Cor. ..	,, 9	248	323	+ 75	36	11,278	+ 1,189
Bury Corporation	,, 9	1,171	1,503	+ 332	36½	60,291	+ 7,766
Chatham & District ..	,, 6	1,028	1,084	+ 56	49	62,331	+ 2,060
Cork Electric	,, 6	480	548	+ 68	49	27,011	+ 1,965
Derby Corporation	,, 8	933	1,216	+ 282	36	44,065	+ 2,697
Dublin United	,, 7	6,070	6,826	+ 756	49	329,598	+ 31,796
Dundee City	,, 5	1,305	1,542	+ 237	29½	45,438	+ 4,400
East Ham Corporation ..	,, 8	1,158	1,245	+ 87	36	50,375	+ 3,067
Exeter Corporation ..	,, 7	363	349	— 14	36	14,692	— 121
Glasgow Corporation ..	,, 8	23,130	26,644	+ 3,514	27¾	725,661	+ 84,181
Glossop (U.E. Sup. Co.) ..	,, 8	126	172	+ 46	49	7,608	+ 806
Halifax Corporation ..	,, 4	1,865	2,221	+ 356	35½	88,830	+ 8,038
do. Motor Buses ..	,, 4	44	49	+ 5	35½	1,745	— 42
Hastings and District ..	,, 9	834	953	+ 119	49	60,725	+ 9,781
Huddersfield Corporation ..	,, 8	2,496	3,120	+ 624	36	116,143	+ 12,647
Ilford U.D. Council ..	,, 8	604	724	+ 120	36	27,712	+ 2,996
Ipswich Corporation	,, 8	383	515	+ 132	36	24,804	+ 5,804
Isle of Thanet	,, 8	214	140	— 74	10	1,606	— 1,114
Kilmarnock Corporation ..	,, 8	161	209	+ 48	29½	5,922	+ 650
Lanarkshire	,, 6	2,111	2,841	+ 730	49	135,957	+ 22,659
Lancashire United	,, 5	1,691	2,413	+ 722	49	115,357	+ 25,905
Leeds City	,, 8	9,052	10,908	+ 1,856	36	399,486	+ 43,287
Leicester Corporation	,, 3	3,149	3,999	+ 850	..	..	..
Leith Corporation	,, 1	830	1,059	+ 229	28½	31,025	+ 5,601
Leyton U.D. Council	,, 6	1,407	1,819	+ 412	36	68,140	+ 7,985
Liverpool Corporation	,, 8	13,951	16,577	+ 2 626	48½	764,495	+ 73,682
Llandudno & Colwyn Bay	Nov. 30	162	225	+ 63	52	18,058	— 715
London County Council	Dec. 12	45,289	54,212	+ 8,923	36½	2,004,579	+ 267,273
Maidstone Corporation ..	,, 6	176	220	+ 44	36	8,856	+ 884
Manchester Corporation	,, 8	17,400	21,100	+ 3,700	36	747,982	+ 65,934
Nelson Corporation	,, 1	210	237	+ 27	35	8,289	+ 707
Newcastle-on-Tyne Cor.	,, 8	6,570	8,010	+ 1,440	36	284,288	+ 41,488
New St. Helens & Dist. ..	,, 5	963	1,234	+ 271	23	33,583	+ 8,039
Northampton Cor.	,, 7	670	809	+ 139	36	30,289	+ 4,313
Nottingham Corporation	,, 6	3,554	4,531	+ 977	36	159,699	+ 17,533
Oldham Corporation .	,, 9	2,141	2,734	+ 593	37	105,239	+ 13,224
Portsmouth Corporation	,, 8	2,054	2,439	+ 385	..	..	..
Provincial	,, 8	1,839	2,227	+ 388	9¾	22,857	+ 2,725
Reading Corporation	,, 6	792	1,052	+ 260	36	38,138	+ 7,058
Rhondda Tramways	,, 29	1,264	1,556	+ 292	48	72,255	+ 10,508
Rotherham Corporation ..	,, 12	1,494	1,880	+ 386	36½	66,411	+ 9,143
Salford Corporation	,, 10	4,951	6,597	+ 1,646	36¾	241,566	+ 41,120
Sheffield Corporation	,, 9	10,464	12,519	+ 2,055	37	446,406	+ 54,535
Southampton Cor. . ..	,, 5	1,528	2,068	+ 540	35½	73,636	— 12,980
Southend-on-Sea Cor. ..	,, 5	627	659	+ 32	36	33,867	+ 1,007
South Shields Cor.	,, 8	780	934	+ 154	36	34,468	+ 3,933
Sunderland Corporation .	,, 9	1,548	1,849	+ 301	36	66,337	- 6,304
Sunderland District ..	Nov. 28	624	746	+ 122	4	3,097	+ 536
Swindon Corporation	Dec. 12	190	250	+ 60	36¼	9,979	- 2,399
Torquay Tramways .	Nov. 29	463	641	+ 178	48	32,050	+ 3,442
Tyneside Trys. & Trmrds.	,, 21	525	811	+ 286	21	18,921	- 4,749
Wallasey Corporation .	Dec. 8	1,133	1,388	+ 255	36¼	57,744	+ 7,151
Walsall Corporation ..	,, 8	761	995	+ 234	36	35,561	+ 5,254
Walthamstow U.D. Coun.	,, 8	907	1,113	+ 206	36	44,910	+ 4,896
Warrington Corporation	Nov. 29	524	701	+ 177	35	19,506	+ 2,037
West Ham Corporation	Dec. 6	2,971	3,692	+ 721	35½	131,840	+ 15,311
Wigan Corporation .	,, 6	1,619	2,137	+ 518	36	72,184	+ 11,033
Yorkshire (West Riding)	,, 9	1,578	2,220	+ 642	49	104,683	+ 18,623

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., Hull, London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Dec. 9	£52,955	£54,898	49	£2,547,822	+ £40,436
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo (4 wks)	Oct. 7	3,390	3,560	28	22,113	+ 3
Brazilian Traction (Mirs.)	Oct.	7,262,000	8,006,000	43	76,436,000	+ 6,023,000
Brisbane	Sept.	32,530	31,600	39	204,840	— 2,820
British Columbia .. $	Oct.	445,263	491,964	17	1,842,476	+ 146,817
Buenos Aires Lacroze ..	Nov.	39,133	39,679	21	189,575	— 1,214
Burmah Tram. & Light Rs.	Oct.	29,768	28,955	13	81,837	+ 3,907
Calcutta .. .. Rs.	Dec. 8	72,961	71,342	49	3,338,317	— 1,525
Cape Town	Oct.	14,238	17,128	..	..	..
Carthagena and Herrerias	Nov.	2,252	3,932	47	45,142	+ 17,751
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
East India	Nov.	1,942	871	17	5,174	— 3,893
Hong Kong .. .. $	Sept. 29	14,272	15,032	39	528,678	— 40,791
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Nov.	3,140	3,741	47	44,357	— 2,042
Lima	Oct.	33,303	37,537	43	359,732	+ 22,341
Lisbon .. .. Escu	Oct.	203,955	249,406	..	..	..
Madras .. (2 weeks) Rs.	Nov. 30	29,664	33,914	47	765,562	+ 70,392
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	Sept.	141,286	157,761	..	..	..
Montevideo	Nov.	28,404	31,060	4	31,060	+ 2,656
Pernambuco	Dec. 9	3,553	4,691	48	189,710	+ 38,210
Peruvian .. .. $	Nov.	925,820	1,034,790	21	4,987,180	+ 472,530
Port Elizabeth	Oct.	3,131	3,885	..	..	..
Rangoon	Nov.	5,033	5,358	47	55,379	+ 1,975
Shanghai .. .. $	Oct. 3	24,953	28,458	..	..	..
Singapore .. .. $	Oct. 20	12,463	12,669	42	543,019	+ 12,809
Toronto .. .. $	Oct.	907,460	1,043,886	43	9,934,998	+ 1,021,774
Winnipeg .. .. $	Oct.	278,817	301,722	43	2,733,516	— 6,755

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Thursday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BOLTON.

Electricity Department.

The Electricity Committee of the Bolton Corporation invite tenders for the supply, delivery and erection of the following plant at their Generating Station, Back-o'-th-Bank, Bolton:—

One 7,500-kw. Turbo-Alternator with Condensing Plant.

Specification and form of tender may be obtained from Mr. W. J. H. Wood, Borough Electrical Engineer, Back-o'-th-Bank, Bolton, on receipt of a deposit of one guinea, which deposit will be returned on receipt of a *bona fide* tender.

Sealed tenders on the prescribed form, endorsed "Tender for Turbo-Alternator," must be delivered to me not later than 12 o'clock noon, January 15, 1918, addressed to the Chairman of the Electricity Committee.

The acceptance of any tender will be subject to the sanction of the Local Government Board being obtained for the necessary loan.

The Corporation do not bind themselves to accept the lowest or any tender.

Town Hall, Bolton, December, 1917.

SAMUEL PARKER, Town Clerk.

TO MAKERS OF STEAM TRACTORS.

The Metropolitan Asylums Board invite tenders for the supply and delivery to Caterham Asylum, Caterham, Surrey, of one five-ton steam tractor and three six-ton trailers, in accordance with specification prepared by Mr. T. Cooper, M.Inst.C.E., Acting Engineer-in-Chief.

The form of tender, contract, and specification may be inspected at the Office of the Board, Embankment, E.C.4., on and after 10 a.m. on Saturday, December 22, 1917, and then can be obtained upon deposit of £1. The amount of the deposit will be returned only after the receipt of a bona-fide tender.

Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 5 p.m. on Thursday, January 10, 1918.

By order,
T. DUNCOMBE MANN,
Clerk to the Board.

December 15, 1917.

POSITIONS VACANT.

OVERHEAD LINESMAN.

Wanted, Overhead Linesman, for small tramway undertaking. Applications will only be considered from men who have had good experience in construction work and ineligible for the Army.

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Applications, stating age, present employment, and previous experience, to be made to the General Manager, Corporation Tramways, Oldham.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

Appointment of Traffic Superintendent in Tramways Department.

Applications are invited for the position of Traffic Superintendent of the Walthamstow Council Tramways, at a salary of £150 per annum, with a maximum of £200 per annum, without War Bonus.

Applicants must have had practical experience in the regulation and control of tramway traffic, and a thorough knowledge of electric car equipment.

A schedule of the duties attached to the office may be obtained on application to Mr. William Murray, A.I.E.E., Tramways Manager, Chingford Road, Walthamstow.

Applications in the candidate's own handwriting, stating age and past experience, and accompanied by copies of three recent testimonials, should be delivered by post only, to the undersigned, endorsed "Traffic Superintendent," not later than 5 p.m., on Friday, the 28th day of December, 1917.

Town Hall, Walthamstow. December 12, 1917.

C. SYDNEY WATSON, Clerk of the Council.

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Wakefield & District Light Railway
Londonderry Tramways Company
Calcutta Tramways Company, Ltd.
Cawnpore Electric Tramways
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Newcastle-on-Tyne Corporation Tramways
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Hastings & District Electric Tramways Co., Ltd.
Gosport and Fareham Tramways Co.
Doncaster Corporation Tramways
Cardiff Corporation Tramways
Plymouth Tramways
Gloucester Corporation Light Railways
Ilkeston Corporation Tramways
Stockport Corporation Tramways
Accrington Corporation Tramways
Ilford Council Tramways
Aberdeen Corporation Tramways
Bradford Corporation Tramways
Southampton Corporation Tramways
Halifax Corporation Tramways
Perth Corporation Tramways
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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE. NORFOLK STREET, LONDON, W.C.

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SATURDAY DECEMBER 22, 1917.

PARCEL TRAFFIC IN WAR TIME.

A successful parcel-carrying business is associated with a number of the tramway undertakings in this country, but it cannot be said that this branch of the industry has been as widely developed as it might be. Perhaps one of the most noted cases is that of the tramways in the Black Country, where special wagons are employed for the conveyance not merely of small but of bulky and heavy packages. That is an inter-urban service, where probably the opportunities are greater than in the case of a tramway serving only one town and its suburbs. The development of parcel traffic has frequently been advocated at meetings of the tramway associations and in these columns, but "the step"—as Emerson has somewhere said—"from knowing to doing is rarely taken." There is, consequently, room for much good work. One of the innumerable results of the present war promises to be a development of the sort greater than has yet been seen. Dogged by the ever-increasing scarcity of petrol, the shopkeeper and the manufacturer are hard put to it, in the task of delivering goods to customers within the comparatively short distances for which railway transit is not prefererd. With a view to economising petrol for motor lorries and vans, and also the number of drivers and of horses, merchants have been urged to co-operate to reduce mileage and even to restrict deliveries. The co-ordination of road transport for parcels and goods has, in fact, become the care of a Government Department, and the latter, it appears, has now awakened to the fact that it is possible to use tramcars for carrying parcels. It has already been taking steps to secure the most economical use of motor lorries and their co-ordination with railways. A circular letter or its equivalent has now been sent to a number of tramway authorities in the country, asking if they can make more use of the cars for the conveyance of parcels. The special value of the proposal from the war necessities point of view is that it does not involve the consumption of any petrol, that the added consumption of coal in the electric power stations would be inappreciable, and that petrol, horses, vehicles, and drivers would become more available for other purposes. We notice that in Leeds a sub-committee of the Food Control Committee have prepared a scheme for carrying out the object in view. It would expand the present modified scheme, and it includes a proposal for the establishment of a central depot for the reception of parcels and also suburban collecting depots. Those who have studied the proceedings of the last conference of the Municipal Tramways Association will remember that at that gathering much was said concerning the large mineral traffic which is now carried over the Leeds tramways. That undertaking will have no difficulty in dealing with parcels, and the same may be said of many other tramways in the country. The neighbouring tramways of Bradford have for some years carried on a highly efficient parcel service. If present tendencies continue, the demand for parcel traffic accommodation on tramways is likely to increase, and quite an organisation will be required for distribution. Parcel trailer cars, or separate wagons even, may come to be necessary in some cases. The parcel trailer car drawn by a passenger car would seem to have points worthy of consideration. In connection with the subject, it is of interest to note that the Executive of the American Electric Railway Association have appointed a war board of five members, whose main function, in co-operation with the appropriate United States Government Department, is to promote goods traffic on the electric railways whenever that is shown to be more economical and expeditious than carriage by the steam railways. The transportation problem is acute in America, as it is here, and it is probable that the American electric lines—so many of them being suburban, rural, and inter-urban—will be able to give more help in the way of carrying parcels and goods than our tramways possibly can do. But a considerable field awaits development here, and whatever can be done will all be in the direction of helping to win the war.

THE NATIONAL TRAMWAY COMMITTEE.

Representatives from Scotland had an interview at the Board of Trade on Tuesday last, with reference to special representation on the recently appointed Tramways (Board of Trade) Committee. Their suggestion was received sympathetically, and Mr. James Dalrymple, general manager, Glasgow Corporation Tramways, was subsequently invited to join the Committee. By this addition to the Committee the members representing municipal tramways are increased to five, while there are three members connected with private tramway enterprise.

The institution of Municipal and County Engineers have made representations to the Board of Trade for the Institution to be fully represented on that Committee, in view of the large extent of permanent way for which members of the Institution are responsible. In the event of compliance, Messrs. J. A. Brodie, A. D. Greatorex, and the two members of the Tramway Rail Standards Committee (Messrs. E. J. Elford and C. F. Wike) were selected as the representatives on the Committee.

A MUNICIPAL TRAMWAY MANAGER'S VIEW.

TO THE EDITOR OF *The Tramway and Railway World.*

DEAR SIR,—I have read with considerable interest, your leading article in THE TRAMWAY AND RAILWAY WORLD of the 8th instant, on the subject of the appointment of a Nationa. Committee of Tramway Managers for the purpose of controlling supplies of material, labour, etc. It is, I believe, the first occasion you have failed to appreciate correctly the feelings of Municipal Tramway authorities on any important matter relating to tramways. You refer to the fact that a serious agitation is on foot amongst the Scottish Tramway authorities on the question of representation on the National Committee, from which it might be inferred that no such agitation exists so far as English Tramways are concerned; but allow me to assure you that the agitation is not confined to the Scottish Tramway authorities, as there is equally as strong a feeling amongst the English Tramway Committees, as they consider that

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a grave blunder has been committed by the majority of the Council of the Municipal Tramways Association in not consulting the various responsible Tramway authorities before accepting the suggestions of the Board of Trade, and by that means securing representation commensurate with the importance of Municipal interests. Unless this is done, you may rest assured that neither the English nor the Scottish Tramway authorities will bow to the absurd representation which it is proposed to give to Municipal undertakings, and Parliament will be invoked through Municipal representatives to have the position altered. This is not to be wondered at, when a comparison is made between the interests involved in municipal and company undertakings. The proportion of municipal undertakings to company undertakings is about four to one, yet three representatives, including the chairman, are allocated to company undertakings, whilst there are only four allowed to municipal tramways, which does not inspire the confidence of municipal authorties.

December 17, 1917. TRAMWAY MANAGER.

TRAMWAYS AND PARCEL CARRIAGE.

Various tramway undertakings are giving consideration to the request of the Government Department responsible for the co-ordination of road transport that greater use should be made of the cars for the conveyance of parcels.

Bradford Corporation tramways have one of the foremost parcel systems in the United Kingdom, and an illustrated account of it was given in our issue of May 8, 1913, with the forms of waybills, reports, etc. The department now handles nearly 10,000 parcels per week, in addition to newspapers. These are all delivered, but collection is only undertaken from business premises in the centre of the city. About thirty sub-offices have been opened in the outskirts for the distribution of parcels. Various departments of the Corporation utilise the parcel service and road material is hauled by special cars. Milk is carried from the municipal depôts and meals for school children are distributed from a central kitchen.

At Leeds two members of the Tramway Committee have been deputed to go into the question thoroughly and report. There is at present a modified system of parcels traffic worked with the minimum of collection, loading, and distribution. Provision is made for carrying parcels up to half a hundredweight from the city to any part of the system, and in some districts delivery within certain limitations is undertaken. Shopkeepers on the line of route also act as agents for the delivery in their own localities, within half a mile radius. There is, however, no collecting of parcels for despatch to the city, parcels being only accepted for conveyance to Leeds on condition that they will be called for at the tramway office at the Corn Exchange. Private carriers are continuing under difficulties of labour shortage, horse shortage, and petrol shortage, but one firm has had to give up business.

The Dublin United Tramways Company have given the public a parcels service since 1883, and particulars in regard to it were published in our first issue (*vide* THE TRAMWAY AND RAILWAY WORLD of January, 1892). The system is worked from a central office through which all parcels pass, and there are numerous receiving offices in the city and suburbs. Conductors receive parcels *en route* for the central office and supply passengers with a call docket to sign when a parcel is to be sent for. Parcels booked at the central office are forwarded at frequent intervals in large baskets to the different stations. Special terms are made for newspapers and also for traders. The system has been much developed. In 1884 the amount received for parcels delivery amounted to £659; this had incresaed to £6,987 in 1916. The company now owns 46 parcel hand carts, 28 parcel vans, and two motor vans.

CHRISTMAS HOLIDAY DEMANDS.

At a meeting of the Sunderland Town Council it was decided that Corporation cars should not run on Christmas Day, and that the employees should not be paid for that day.

The tramway workers of Llanelly are appealing to the public for their assistance in an endeavour to bring about a cessation of traffic on Christmas Day (as was the case last year).

Burnley Corporation tramway workers have decided by ballot not to work on Christmas Day. The majority was six to one. The Corporation Tramway Committee had previously decided to run cars as usual.

Sheffield Corporation at their December meeting rejected an amendment to the Tramways Committee's recommendation against granting a holiday to the employees on Christmas Day. Sir William Clegg, chairman of the Committee, stated that in the interests of the general public, the Committee felt that they could not accede to the request of the employees. The result had been whispers of threats that there would be a stoppage. A threat would only help to stiffen the backs of the Committee. Last Christmas Day 288,933 passengers were carried. Surely this was proof that they were a convenience. The Committee had decided to grant a holiday to those men who had come back after fighting in France.

At a meeting of Manchester and Salford tramway employees held on Sunday last, it was decided to adhere to their decision not to run tramway cars on Christmas day, except such as can be shown to be required for munition workers. This has been done in spite of Sir George Askwith's advice when the question was raised a year ago. It was stated by the officials of the Tramwaymen's Union that the meeting was summoned in order that the workers might be informed as to what had taken place at the interview a few days previously between their representatives and the managers of the Manchester and Salford Corporations Tramways. The latter had stated that the car service should being on Christmas day at 2.30 p.m. instead of the usual hour in the morning and that work should then be carried on till 11 or 12 o'clock at night. The meeting resolved that should any tramway man, woman or trolley boy work a car on Christmas day without permission from a responsible union official, the rest of the members would refuse to work any cars on New Year's day. It is intended that the night car cleaners employed at the depôts should take Christmas night off as a holiday.

In view of the decision of the employees, Sir George Askwith suggested a conference of representatives of the nineteen authorities in Lancashire and Cheshire and of the men's union. The Tramway and Vehicle Workers' Union rejected the proposal, and the tramway authorities then telegraphed to Sir G. Askwith asking him to send a representative to Manchester to meet both parties.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council on Tuesday, the Highways Committee submitted important reports with reference to the reorganisation of the tramways department, and the principal recommendations are set out below.

REORGANISATION OF THE TRAMWAYS DEPARTMENT—ELECTRICAL BRANCH.

The scheme approved on February 20, 1917, for the reorganisation of the tramways department provided for the appointment of an electrical engineer at a salary of £1,200 to £1,500 a year, and the organisation of the work of the electrical branch on the basis of the electrical section of the department as then organised. The branch was accordingly divided into three sections—viz.: (1) power station section, (2) distribution (southern) section, and (3) distribution (northern) section. The designation of the position of the head of each section was altered and the salaries for the positions were assigned. Mr. P. L. Riviere was appointed electrical engineer on May 22, 1917, and on July 3 promotions were made to the new positions of heads of sections. After consideration of the report of the electrical branch by their sub-committee on tramway organisation, of which Mr. F. C. Harrison is chairman, the Highways Committee now submitted proposals for the appointment of an assistant electrical engineer and for the settlement of certain details of reorganisation not covered by the main scheme.

Organisation at the Office.—As regards organisation at the office, the Committee advised that an assistant electrical engineer should be appointed as soon as possible, and that he should be able as far as possible to give his whole attention to important engineering questions without being too much burdened with office routine work, and that he should be competent to take charge of the branch in the absence of the electrical engineer. The salary of the position should be from £600, rising by four annual increments of £25, and two of £50 to £800 a year. The appointment of a senior technical assistant was also advised to deal with the engineering office work, much of which is highly technical, involving the keeping and supervision of various engineering records. The object of this appointment is to leave the electrical engineer and the assistant electrical engineer as free as possible to deal with urgent matters and to exercise a wider supervision in order to obtain more economical and satisfactory running. The Committee suggested that the salary of the senior technical assistant should be from £350 a year rising by annual increments of £25 to £500 a year. They advised the promotion of Mr. F. H. Wigner, who, since the position of electrical assistant became vacant in 1915, has had charge of the office work in the branch and was thoroughly conversant with every detail of the electrical system and staff.

Organisation at the Power Station.—The Committee had been informed that in comparison with the large power station at Manchester, Greenwich power station is under-staffed, and they advise the re-arrangement of duties and certain new appointments. It was thought that the efficiency figure for coal could be raised considerably, and as one per cent. increase in efficiency represents a saving of £2,000 a year, the electrical engineer was confident that more satisfactory financial results would be achieved. At present the power station engineer's time is so much taken up with the necessary routine work of a large station that he is unable to give the necessary attention to running details, while the senior charge engineer is not in a sufficiently responsible position to deal satisfactorily with the control of the staff. The Committee propose that the second position at the station should be that of assistant power station engineer, with a salary of £400, rising by annual increments of £20 to £500, whose time should be devoted as far as possible to the economical running of the station, and they recommended that Mr. J. R. Walker, senior charge engineer, should be promoted to be assistant power station engineer. The Committee have been advised that the supervision of the boiler-house should be re-arranged and investigations carried out, a course which involves the appointment of an additional charge engineer with a salary of £250, rising by annual increments of £10 to £300. Mr. Rudolph Thompson was recommended for appointment to this position.

Organisation of Distribution Sections.—The Committee proposed the appointment in each of the two sections of a sub-station superintendent at a salary of £250, rising by annual increments of £12 10s. to £350 a year, whose duty it would be to obtain increased efficiency in sub-station running. To the positions of sub-station superintendents the Committee recommended the

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promotion of Mr. R. S. Good and Mr. N. H. Thomas. The estimated additional expenditure involved by the changes proposed was £1,655 a year, and ultimately £2,905 a year.

Reports with reference to wages and conditions of employment of various classes of employees, entailing an ultimate annual expenditure of £50,500, were submitted.

In consequence of the extended employment of women at the central car repair depôt, the Committee advised that four women supervisers should be appointed to control the women workers in the central car repair depot, and that their rates of pay should be from 35s. to 40s. a week, and from 40s. to 45s. a week respectively, with the addition of war wages equivalent to the amount of those granted to the women workers.

ADVERTISING TRAMWAY SERVICES.

In their report of February 1, 1917, under the reorganisation of the tramways department, the Highways Committee expressed the opinion that a greater use should be made of the Press as a means of conveying to the public the advantages peculiar to the tramway services, that newspaper articles should be encouraged, and suitable matter prepared, and that new and altered services should be advertised in the Press. A scheme modified to meet war conditions has now been prepared, under which the services of the Council's advertising agents, will be utilised pending the organisation of the new publicity sub-section in the tramways department. It is also proposed that concise advertisements should be exhibited on both decks of the tramcars; that these advertisements should be changed say once a month, and that they should form the basis of newspaper advertisements. The cost for the balance of the current financial year is estimated at £1,500, the total expenditure in the full year being estimated at £6,250.

In continuation of previous reports, the General Purposes Committee recorded the names of fourteen officers and employees of the Council who had lost their lives while on war service. Included in the list are seven men of the tramways department.

OPERATING EFFICIENCY.

At an operating department efficiency meeting held in connection with the London Underground Railways and London General Omnibus Company, at the omnibus company's training school, Chelsea, on the 13th instant, Mr. H. E. Blain, operating manager, in the chair, two papers on "Railway Law and Police" were read by Mr. H. Newman, chief clerk of the police section of the office of the superintendent of the line, and Mr. H. J. Smithson, chief enquiry inspector, District Railway, to an audience of nearly 200 of the control staffs.

The authors dealt with the obligations which rest upon railway companies with regard to the safe carrying of passengers, such interesting cases as Atherton *v.* L. & N.W. Rly. (injury from an engine spark), and Cobb *v.* G.W. Rly. (robbing in a train), being quoted, together with the question of liability under Lord Campbell's Act, 1846, which was limited to the actual pecuniary loss sustained. Obligations in connection with the provision of smoking carriages and workmen's trains, and for passengers' luggage were also discussed. It was pointed out as a curious factor that railway companies are insurers of the safe carriage of luggage when placed in their charge, whereas their responsibility for passengers' safety is limited to negligence.

In connection with cloak room accommodation, it is not generally known to the public that railway companies are not, in this connection, common carriers, but act as warehousemen, and the customary condition limiting their liability to a certain sum has been upheld in Courts, unless any higher value has been declared and an increased charge paid. Railway companies are compelled to exhibit fare boards, and to maintain milestone posters with the distance inscribed thereon; failure to do either precludes them from charging tolls. Powers for the protection of railway companies are frequently obtained in by-laws, and both authors from their long experience made a number of useful suggestions for their improvement. Examples of the curious fascination of fraudulent travelling were given, and improvements in the method of detection suggested.

An exceptionally interesting discussion was opened by Mr. F. F. Fausset, legal assistant in the commercial manager's department, and Mr. W. Nice, chief ticket inspector on the tube railways, and was taken part in by a number of the inspectors and others actually engaged in this department of railway work. The outcome of the evening was a considerable number of thoroughly practical suggestions, and the proceedings closed with a vote of thanks to the authors, proposed by Mr. Murray Griffith, director, District Railway, and seconded by Mr. W. E. Blake, superintendent of the line.

Postal Aerial Line.—Arrangements for the establishment of a postal aerial line between England and France are said to be well advanced. The British Government has yet to complete a definite agreement. A French mission has already consulted with the British Air Board, and the Director of Postal Services has negotiated with the British Post Office for a convention.

Lightless Nights in the U.S.—The Washington Fuel Administration has decreed that "lightless nights" must be observed once a week throughout the United States. The object of the Order is not only to save coal, but also "to provide startling and visual evidence that the United States is engaged in the conduct of the greatest of world wars." Presumably the lighting in street railway cars will be reduced.

MISCELLANEOUS NEWS AND NOTES.

The Anglo-Mexican Petroleum Company, Ltd., and the Highways Construction, Ltd., have transferred their offices from Finsbury Court to 16, Finsbury Circus, E.C.

London Traffic Suspended.—The warning of Tuesday's air raid on London was given while the evening traffic was at its height. For a considerable period railway, tramway, and omnibus traffic was held up on account of the artillery barrage. On Wednesday evening locomotion was rendered difficult by a bad fog.

Women Tramway Drivers in America.—New York City has led the way in introducing women workers on American tramway cars. The first woman conductor started work on the Broadway route on December 14. Many others are in training and as men are called up for military duty women will take their places.

Road Maintenance Contracts.—The Corporation of London has resolved to pay an increase of 35 per cent. on existing asphalt and wood paving contracts and 50 per cent. on future contracts for repairs and reinstatement during the war, and an increase of from 11 to 17½ per cent. on sewers and masons' and paviors' work.

Fatal Accident at Wigan.—On Saturday night, December 15, while the trolley arm of a Wigan tramcar was being changed, the car started, and without a driver ran at high speed down a steep gradient. It jumped the points after running a mile, and wrecked a dwelling house. One woman was killed and three persons were injured.

Purchase of Lighting Material Barred.—York Electricity and Tramways Committee have been prevented from improving the dangerous street lighting owing to the refusal of the Ministry of Munitions to sanction the purchase of material. The Corporation have directed the manager to interview the Ministry on the matter, as girls employed on munitions incur great risk by walking home in the early morning through darkened streets.

Removal of Sheerness Tramways.—Arrangements have been made for the removal of the tramways and the taking up of the rails in the Sheppey Rural District, in consequence of the discontinuance of the service. The Urban District is, however, raising some objection to the removal of the rails, and there is some difficulty in regard to the reinstatement of the roadway, so that action is likely to be delayed for the present.

Inspectors and a Union.—The statement made in our issue of last week that the Blackburn Tramways Committee had refused a request made by the tramway inspectors that they should have the right to join the Tramways Workers' Association, which we received from a usually accurate source, is, we are informed, incorrect. No such request has been made to the Committee, nor do the inspectors wish to join the same association as the men.

Application for Tramwaymen's Release.—A number of men called up from Dover Corporation Tramways for military service have never yet been out of the town. The Tramways Committee have asked the military authorities to release several soldiers in order that they may return to tramway work. Under the regulations governing the passing of skilled men of mature age into what is known as the War Reserve, such applications ought to prove successful in regard to motormen.

Tram Car Tires.—The paper read by Mr. Arthur Norton, of Brown, Bayley's Steel Works, Ltd., at a meeting of the Tramways and Light Railways Association in July last, has been reprinted in a 40 page pamphlet (8½ ins. by 6 ins.), which includes numerous illustrations and diagrams, the discussion on the paper and the author's full reply thereto. The publication forms an interesting and very useful discussion of a matter which should receive the careful study of every tramway engineer and manager.

A Railless Car Run into by a Tramcar.—At Leeds on Friday evening, December 14, a trackless car, which was standing at the top of Aire Street with lights extinguished while the trolley was being changed over, was run into by a tramcar leaving City Square. The attention of the driver of the tramcar being called to the rear of his car by the ringing of the conductor's bell, he did not notice the darkened vehicle in front until the collision occurred. Both cars were damaged, and the driver of the tramcar was slightly injured.

Furious Driving of a Tramcar.—Joseph Amos, a discharged soldier, summoned before the Oldham magistrates on December 12, was fined 10s. for having furiously driven a tramcar on the night of November 29. A police constable said that he was on point duty at Manchester Street crossing and gave Amos the signal to pass the crossing. Amos drove over and went at a furious rate down the incline, estimated at 25 to 30 miles an hour. He had been driving about nine weeks. The chief constable said that there was no question about the man's capability as a driver, but he put on too much speed. He had been cautioned by the general manager about a similar thing.

New Transport Scheme.—In the House of Commons on Monday General Croft asked the President of the Board of Trade whether, in view of the desirability of improving the transport facilities in the United Kingdom, his attention has been called to the proposals of the New Transport Company, and whether he proposed to take any action. Mr. Wardle (Parliamentary Secretary, Board of Trade): Certain proposals on behalf of the New Transport Company were put before the President of the Board of Trade by a deputation which he received on November 23, and my right hon. friend pointed out that any inquiry with reference to the adoption of the company's main scheme was, in his opinion, impracticable during the war. He offered, however, to consider a proposal which the company had in mind to enable shipping at ports to be turned round more rapidly.

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Motor Spirit and Lighting Regulations.—The Car and General Insurance Corporation (83, Pall Mall, London, S.W.1) have issued a card giving the summary of the motor spirit restrictions, Order No. 2, 1917, and the lighting regulations, which are of special interest to all motor vehicle owners.

Coal Gas for Traction.—The Automobile Association Executive Committee has decided to offer a prize of £1,000 for the best invention which will enable coal gas to be used with advantage as a propellant of motor cars and motor cycles. A small sub-committee has been formed to prepare the conditions, which will be announced in due course. The sub-committee will gladly consider suggestions addressed to the Secretary, Automobile Association and Motor Union, Fanum House, Whitcomb Street, London, W.C.2, and marked "Coal Gas."

An American View of the Position.—Last week we gave the German view of the military position as seen by Herr Walter Rathenau. As an antidote reference may be made to the statement of General Pershing to the American people, which he recently sent through Mr. Charles W. Whitehare, secretary to the Cornell University Y.M.C.A. "Go back home," said General Pershing," and dispose of that doctrine that we cannot break through the German lines. We can break through with a human wedge and we will. Tell everybody you meet of our determination to win."

Women Drivers Withdrawn at Southend.—As a result, apparently of threats by the local branch of the National Federation of Discharged and Demobilised Soldiers and Sailors, women tramcar drivers at Southend were withdrawn from the cars on Sunday last. Discontent had arisen owing to the large number of disabled soldiers in the town available for employment, but a dozen discharged men are already driving cars, and it was understood that others will be taken on as they become proficient. A deputation from the Federation was to wait on the Town Council.

Plymouth Tramway Matters.—At a recent Council meeting Alderman T. G. G. Willis suggested that the Tramway Committee should place a tramway shelter over the long loading platform in George Street, as a useful protection for people waiting in the rain. Councillor Moses inquired whether the Committee had yet received a permit from the Ministry of Munitions to enable them to obtain the new cars ordered long ago, which were necessary for carrying munition workers to and from their employment. Alderman Phillips, chairman of the Committee, promised that the question of a shelter should be brought before the Committee. A permit for the new cars had been received and steps had been taken to procure the cars, but it would be two or three months before they would be ready to run. Replying to another questioner, Alderman Phillips said that the track nearly everywhere was out of repair. The Committee were doing the best they could with the small number of men left to keep it in some sort of order, but they were not satisfied with its condition.

Wages of Employees.—Further evidence was heard by the Committee on Production on Friday, December 14, in the application of the tramway and electric light employees at Cardiff for an advance in wages. It was asked that the present wages should be increased by 75 per cent. on the pre-war rate. It was pointed out that the application if granted would mean an increase of £25,000 in the wages bill, or, with the advance already granted, £35,000. The case for the Corporation was put forward by the Lord Mayor (Alderman William Roberts), Sir John Courtis, Mr. F. W. Blower, the town clerk (Mr. J. L. Wheatley), and the city electrical engineer (Mr. Arthur Ellis).—Sunderland Council have decided to increase the war bonus payable to male adult employees in the tramway department from 12s. to 15s. per week.

Birmingham Tramways Committee have decided to give the whole of their employees an advance of 5s. a week as from the first pay day in December. The motormen will then receive a commencing wage of 49s. 6d., and the women conductors a minimum of 46s. a week. It is estimated that the additional wages will amount to about £40,000 per annum. The Committee merely adopted the recommendation of the Labour Committee that the recent award of the Committee on Production to the engineers of the country, on the ground of increased cost of living, should be extended to all Corporation employees.

Belfast Tramway Arbitration.—At a meeting of the Belfast Town Council on December 3, Alderman Tyrrell drew attention to the two recent findings of the Committee on Production dealing with matters affecting the electricians and the motormen and conductors. He said it would be impossible to overestimate the importance of matters involved in the electricians' arbitration, because a principle of a far-reaching character was concerned. When narrowed down the question was whether the Corporation had the right to direct its own policy, do its own work, institute when it thought proper a scheme of retrenchment for efficiency in the general interest of the ratepayers, or whether an outside body in no way responsible had the right to veto the Corporation's policy. Sir George W. Gibb had said that the arbitration was the longest he had presided over. Alderman Tyrrell paid a tribute to the services of the town solicitor and the tramways manager at the arbitration. The result was that Mr. Moffet would now be able to maintain the overhead equipment with a staff of about half the number employed before, thus effecting a saving of £20 to £30 a week in wages. In the second arbitration the motormen and conductors were awarded an increased bonus of 3s. per week. While he did not say the men did not deserve it, it meant an additional charge of £6,000 a year, and he did not know what the result of the year's working would be. Councillor White eulogised the services of Alderman Tyrrell in connection with the arbitration.

PERSONAL.

Mr. Arthur W. C. Shelf has been awarded by the Council of the Society of Engineers the Bessemer premium for his paper on "High Tensile Steel *v.* Mild Steel."

Mr. James Dalrymple, general manager of the Glasgow Corporation tramways, has been appointed by the Board of Trade a member of the Tramways (Board of Trade) Committee.

Messrs. A. & F. Manuelle, Ltd., have removed to more convenient offices at 4 and 6, Throgmorton Avenue, London, E.C.2. Their telephone number remains as hitherto, London Wall 8836, and their telegraphic address will be "Feldspar, Ave., London."

Mr. F. Dudley Docker, C.B., chairman of the Metropolitan Carriage, Wagon and Finance Company, Ltd., has joined the directorate of the British Westinghouse Electric and Manufacturing Company, Ltd., as a consequence of the purchase by the former company of the American-held shares of the British Westinghouse Company.

R. W. Blackwell and Company, Ltd., owing to their offices having been requisitioned by the Government, have removed to 36, Emperor's Gate, South Kensington, London, S.W.7. (Telegrams, "Kurkee, Southkens, London." Telephone: Western 4362, 4363 and 4364). Their new premises are just off the Cromwell Road, two minutes' walk from the Gloucester Road station of the Underground Railway.

Mr. J. B. Hamilton.—At a recent meeting of the Leeds Tramways Committee, a letter was read from the Admiralty thanking the Corporation for placing the services of Mr. J. B. Hamilton, the tramways manager, at their disposal during the last ten months, paying a high tribute of appreciation to the excellent work he had done, and recognising the great knowledge and ability he had shown. They further requested that his services should be at their disposal again if required, but, as the Board of Trade were organising a Tramways Control Committee to deal with congested tramway traffic in municipal areas, Mr. Hamilton had been transferred to that department. The Committee expressed their appreciation of the letter from the Admiralty, and congratulated Mr. Hamilton upon it, and extended to him the privilege he has recently had of placing his services at the disposal of the nation, while keeping in touch with local affairs.

Personnel of Fraser & Chalmers, Ltd. Addressing the annual meeting, Mr. A. H. Wilson Tait, the chairman of the company, said he mentioned at a previous meeting that the directors had established an office at Petrograd, and Mr. Catlin, their manager in Russia, had been building up connections for future trade, and had secured several orders for turbines and other articles. Owing to the upheaval in that country, they considered it prudent to ask Mr. Catlin to return and confer with the directors, and, as a result, they felt that until the political and economic atmosphere cleared there was little prospect of active development. Meantime, Mr. Catlin had undertaken a visit to the United States, so that the board might be made familiar with the developments there, and it would no doubt strengthen their connections when they were able to recommence activities in Russia. The chairman also made special reference to the work of Mr. McDermott, the managing director, Mr. Rogers, the general manager, and the whole of the staff. Mr. Vere H. Smith congratulated the directors on the year's work, and noted with satisfaction that the company was specialising in certain forms of manufacture. From what he saw during a visit to the works, it was apparent that the general manager, Mr. Rogers, was the rare combination of expert, engineer, and keen business man, with great charm of manner. The meeting re-elected Messrs. R. T. Bayliss and W. B. Rommel as directors, and votes of thanks were accorded to the directors, and particularly to the managing director, the secretary, general manager, and the staffs at home and abroad.

CONTRACTS AND ORDERS.

Walsall Corporation Gas Department intend to purchase a motor vehicle at an estimated cost not exceeding £200.

Alley and MacLellan, Ltd., have an order from Stoke-on-Trent Board of Guardians for a 5-ton Sentinel steam wagon at £950.

Barrow-in-Furness Town Council have authorised the electrical engineer to seek Government permission to obtain tenders for an additional turbo-alternator.

Keighley Council have ordered an induced draught fan at a cost of £1,500, in order to increase the capacity of the boiler house plant at the electricity works.

Glasgow Tramways Committee have ordered 250 steel tires from H. Bessemer and Company, Ltd., in addition to the 500 tires to be supplied by Brown, Bayley's Steel Works, Ltd., as mentioned in our last issue.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended December 8 give total receipts of £193,987 or £36,164 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £95 12s. 1d. per mile of single track, and last year at the rate of £77 15s. 8d., thus showing an increase for the week of £17 16s. 5d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

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FINANCIAL REPORTS AND MEETINGS.

Coventry Chain Company, Ltd.—The board have announced a final dividend of 7 per cent., and a bonus of 3 per cent. on the ordinary shares, making 15 per cent. for the year.

Edison Swan Electric Company, Ltd.—The profits for the year ended June 30 last amounted to £18,694, and after payment of munitions levy and writing down expenses of a new issue, £13,267 is carried forward.

Yorkshire (West Riding) Electric Tramways Company.—The directors have decided to pay on January 1, 1918, a final dividend of 3 per cent., being at the rate of 6 per cent. per annum, on the 6 per cent. cumulative preference shares.

Vulcanite, Ltd.—The report for the year ended October 31 last states that the net profit, after providing for excess profits duty, amounted to £12,958, and the amount brought forward from last year was £2,131. A dividend is recommended on the ordinary shares at the rate of 10 per cent., less income tax, and a bonus of 6d. per share free of tax. A sum of £1,432 is written off patents, £2,292 transferred to depreciation, and £3,252 carried forward.

Provincial Tramways Company, Ltd.—Mr. Andrew Beattie (chairman) presided at the meeting of the Provincial Tramways Company in London. It is said that the net revenue for the past year was not so high as in the previous year, although the traffic receipts were up by £951, as compared with 1916. It was, in fact, the best year in the history of the company so far as traffic was concerned. Maintenance of rolling stock showed an increase of £744, coal and oil an increase of £1,646, and wages an increase of £1,691. In 1915 the excess profits duty absorbed £5,275, and in 1916 it amounted to £13,641. So the total increased expenditure for the year was £25,222. The reserve fund stood at £102,000, of which £40,000 had been invested in Government securities. The report was adopted, and it was agreed that a dividend be paid upon the £1 ordinary shares of 10d. per share, and a bonus of 6d., equal to 1s. 4d. per share, making, with 8d. per share paid in June, 2s. per share. Mr. Samul Hern, who was re-elected a director, has been associated with the company for 30 years.

Record Turbine Order for Fraser & Chalmers, Ltd.—Mr. A. Wilson Tait (chairman), at the annual meeting of Fraser & Chalmers, Ltd., of London and Erith, on December 13, said he mentioned last year that the company had built turbines of over 5,000 kw. capacity, and that still larger units were being prepared. It was a tribute to the company's design and sound manufacture that they had secured an order for one of two of the largest turbine units for operation in this country. The capacity of these machines was 15,000 kw., and they hoped and believed that when this machine was installed and in operation it would still further enhance the name of Fraser & Chalmers as turbine builders. As an instance of the rapid development in the use of electrical power, it would be interesting if he quoted a statement made by M. Insull, of the Commonwealth Edison Company, of Chicago, relative to the increase of the generating capacity of that company. The capacity in 1912 was 230,000 kw., in 1916 360,000 kw., at the end of the present year it would be 452,000 kw., and in 1919 it was expected to be over 600,000 kw., so that the generating capacity would have increased almost three-fold in seven years. Practically all these units were turbine-driven. Other companies and corporations were following suit, and in this country the development which had taken, and was taking, place was very large, and the demands which would mature in the near future, particularly in connection with railway electrification, both here and abroad, would be enormous. It was the intention of the directors to participate in this development, and to get their fair share of the business. The reputation the company had gained for this work would render it necessary to seriously consider an important extension of their manufacturing plant. In dealing with the details of the year's trading, the chairman stated that the net profit was £36,174, as compared with £24,668 for the previous year, after providing for all expenses and depreciation on plant, buildings, and machinery, and making provision for excess and controlled profits. The progress of the company during the past five years had been undoubtedly satisfactory. During the past year the reserve account had been increased, by the transfer of £20,000 from profit and loss, to £100,000. The preference dividend of 7½ per cent., less tax, for the year was paid in July, and the directors now recommended a dividend of 5 per cent., less tax, on ordinary shares. After providing for these dividends and transferring £20,000 to reserve account, there was a balance of £16,772, which it was proposed should be carried forward.

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5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	69	68½
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4¾	50/-	55/7½
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¾	46/3	46/3
4%	4%	Do. 4% Deb.	100	91	70½	70½
4½%	4½%	Do. 4½% Deb.	100	98½	69½	69½
5%	5%	Do. 5% Deb.	100	96	66½	66½
—	—	Associated Omnibus Co., Ord. ..	5/-		1/3	1/3
7d.	1/-	Auckland Elec. Trams. Ord. ..	1	1	20/-	20/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102½	90½	90½
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102½	101½
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	⅛	11/-	11/-
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	71½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11½	9½	9½
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	45	46
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	89	90½
4/-	4/-	Brisbane Elec Trams. Ord. ..	5	7½	£6/15/9	£6/15/9
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	29½	29½
6%	5%	Do. Pref. Ord.	100	106	29½	29½
5%	5%	Do. 5% Cum. Pref. ..	100	103	42½	42½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	40	99½	82½	82½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	57½	57½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	32	32
6%	6%	Do. 6% Cum. Part. Pref.	100	—	72½	72½
5%	5%	Do. 5% Deb.	100	92	77½	77½
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65	65½
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	73½	73½
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	6⅞	6⅞
2/6	2/6	Do. 5% Cum. Pref. ..	5	5⅛	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74	74
1/-*	1/-*	Cape Elec. Trams.	1	⅛	12/3	12/3
1/3	1/3	City of B. A. Trams	5	5½	82/1½	80/-
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82	82
%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
5/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10½	10½
—	—	Hastings & Dis. Elec. Tram Ord.	10/-	⅛	-/9	-/9
1/2½*	1/2½*	Do. 6% Cum. Pref. ..	1	⅛	9/3	9/3
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	1/6	17/1½	17/1½
5%	5%	Do. 5% Deb. ..	100	87½	80½	80½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44½	44½
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅛	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co. ..	10	10½	9½	9½
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	71
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9½d.*	9½d.*	Llandudno & Colwyn B. Ord.	1	—	10/-	10/-
--	1½d.	London & Sub. Traction Ord. ..	1	⅛	2/3½	2/3½
6d.	6d.	Do. 5% Pref.	1	⅛	7/-	7/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	61½	61½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81½	81½
5%	5%	Do. 5% Inc. Deb... ..	100	88½	80	80
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	35	35
3/-	3/-	Madras Elec. 6% Pref. ..	5	5⅛	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.*	9½d.*	Manaos Trams & Ltg. Ord. ..	1	3/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	71	71
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	72	72
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1½	$1½	Mexico Trams. Common ..	$100	70	31	31
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	35	35
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. ..	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. (1922)	100	99	88½	88½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	⅛	19/9	20/-
9½d.*	9½d.*	New General Traction	1	¼	7/3	7/3
8½d.	6d.	Northern Gen. Trans. Ord. ..	1	⅞	12/9½	12/9½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	81/3	78/1½
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	6/6	6/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/3	12/-
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	11/16	6/7½	6/3
6d.	6d.	Do. 5% Pref.	1	1	11/7½	11/9
1/4	8d.	Provincial Trams. Ord. ..	1	¼	20/3	20/3
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	87	86½
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	76	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	87½	87
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74	74
12/-	10/-	Shanghai Elec. Cons.	10	13	14½	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/7	4/7
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	91½	91½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77½	77½
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	66
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	¼	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	¼	84/7½	84/7½
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	15	15½
—	—	Undgd. Elec. Rys. of London ..	10	21½	32/-	33/1½
		Do. "A"	1/-	¼	5/1½	5/1½
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102½	103½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	101½	101½
4%	4%	Do. 6% In. Bonds Rd. ..	—	88½	80½	81

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Dec. 4	393	455	+ 62	35	15,673	+ 1,384
Aberdeen Corporation ..	,, 12	1,787	2,022	+ 235	28	60,721	+ 6,778
Ayr Corporation ..	,, 15	249	335	+ 86	31	15,475	+ 1,731
Belfast City	,, 14	5,735	7,028	+ 1,293	37	280,801	+ 28,601
Birkenhead Corporation	,, 16	1,400	1,835	+ 435	37½	68,473	+ 10,702
Birmingham Corporation	,, 8	13,850	19,356	+ 5,506	36	663,699	+ 85,686
do. Motor Omnibuses ..	,, 8	905	1,166	+ 261	36	38,071	+ 1,596
Blackburn Corporation ..	,, 12	1,021	1,298	+ 277	37½	55,868	+ 8,796
Blackpool & Fleetwood ..	,, 8	267	362	+ 95	48	42,757	+ 775
Bournemouth Corporation	,, 12	1,759	2,180	+ 421	36½	95,138	+ 8,451
Bradford Corporation ..	,, 8	5,982	7,384	+ 1,402	36	278,884	+ 30,651
Bristol	,, 14	4,266	5,536	+ 1,270	50	271,700	+ 27,481
Burnley Corporation ..	,, 15	1,544	1,812	+ 268	..	..	..
Burton-on-Trent Cor. ..	,, 16	261	334	+ 73	37	11,612	+ 1,262
Bury Corporation	,, 16	1,139	1,384	+ 245	37½	61,675	+ 8,011
Chatham & District ..	,, 6	1,028	1,084	+ 56	49	62,331	+ 2,060
Cork Electric	,, 6	480	548	+ 68	49	27,011	+ 1,965
Derby Corporation ..	,, 15	997	1,158	+ 161	37	45,223	+ 2,859
Dublin United	,, 7	6,070	6,826	+ 756	49	329,598	+ 31,796
Dundee City	,, 12	1,279	1,508	+ 229	30½	46,947	+ 4,634
East Ham Corporation ..	,, 15	1,134	1,218	+ 84	37	51,594	+ 3,152
Exeter Corporation ..	,, 14	341	352	+ 11	37	15,044	— 110
Glasgow Corporation ..	,, 15	22,706	26,475	+ 3,769	28¾	752,137	+ 87,900
Glossop (U.E. Sup. Co.) ..	,, 15	125	167	+ 42	50	7,775	+ 846
Halifax Corporation ..	,, 11	1,778	2,227	+ 449	36½	91,057	+ 8,486
do. Motor Buses ..	,, 11	44	50	+ 6	36½	1,795	— 36
Hastings and District ..	,, 16	840	988	+ 148	50	61,712	+ 9,929
Huddersfield Corporation	,, 15	2,546	3,056	+ 510	37	119,199	+ 13,157
Ilford U.D. Council ..	,, 8	604	724	+ 120	36	27,712	+ 2,996
Ipswich Corporation ..	,, 15	397	550	+ 153	37	25,355	+ 5,960
Isle of Thanet	,, 15	222	144	— 78	11	1,749	— 1,193
Kilmarnock Corporation	,, 15	156	204	+ 48	30½	6,126	+ 697
Lanarkshire	,, 6	2,111	2,841	+ 730	49	135,957	+ 22,659
Lancashire United ..	,, 12	1,618	2,410	+ 792	50	117,767	+ 26,683
Leeds City	,, 15	9,256	10,643	+ 1,387	37	410,131	+ 44,836
Leicester Corporation ..	,, 3	3,149	3,999	+ 850	..	..	..
Leith Corporation ..	,, 1	830	1,059	+ 229	28½	31,025	+ 5,601
Leyton U.D. Council ..	,, 13	1,453	1,746	+ 293	37	69,886	+ 9,438
Liverpool Corporation ..	,, 8	13,951	16,577	+ 2,626	48½	764,495	+ 73,682
Llandudno & Colwyn Bay	,, 7	220	214	— 6	1	214	— 6
London County Council	,, 12	45,289	54,212	+ 8,923	36½	2,004,579	+ 267,273
Maidstone Corporation ..	,, 13	175	210	+ 35	37	9,067	+ 920
Manchester Corporation	,, 15	16,594	20,827	+ 4,233	37	768,809	+ 69,171
Nelson Corporation ..	,, 8	172	218	+ 46	36	8,507	+ 753
Newcastle-on-Tyne Cor. ..	,, 15	6,658	8,100	+ 1,442	37	292,427	+ 43,077
New St. Helens & Dist. ..	,, 12	947	1,249	+ 302	24	34,831	+ 8,333
Northampton Cor. ..	,, 14	704	829	+ 125	37	31,118	+ 4,439
Nottingham Corporation	,, 13	3,661	4,514	+ 853	37	164,184	+ 18,386
Oldham Corporation ..	,, 16	2,042	2,517	+ 475	38	107,757	+ 13,699
Portsmouth Corporation	,, 8	2,054	2,439	+ 385	..	..	..
Provincial	,, 15	1,841	2,252	+ 411	10½	25,109	+ 3,137
Reading Corporation ..	,, 13	808	1,043	+ 235	37	39,182	+ 7,292
Rhondda Tramways ..	,, 6	1,239	1,513	+ 275	49	73,769	+ 10,783
Rotherham Corporation	,, 12	1,494	1,880	+ 386	36½	66,411	+ 9,143
Salford Corporation ..	,, 10	4,951	6,597	+ 1,646	36½	241,566	+ 41,120
Sheffield Corporation ..	,, 16	10,634	12,804	+ 2,170	38	459,210	+ 56,705
Southampton Cor. ..	,, 12	1,552	2,039	+ 487	36½	75,676	+ 13,467
Southend-on-Sea Cor. ..	,, 12	636	609	— 27	37	34,476	— 1,033
South Shields Cor. ..	,, 8	780	934	+ 154	36	34,468	+ 3,933
Sunderland Corporation.	,, 16	1,648	1,931	+ 183	37	68,167	+ 6,486
Sunderland District ..	,, 12	594	802	+ 208	6	4,684	+ 905
Swindon Corporation ..	,, 12	190	250	+ 60	36½	9,979	+ 2,399
Torquay Tramways ..	,, 6	458	628	+ 170	49	32,679	+ 3,612
Tyneside Trys. & Trmrds.	Nov. 21	525	811	+ 286	21	18,921	+ 4,749
Wallasey Corporation ..	Dec. 15	1,114	1,432	+ 318	37½	58,876	+ 7,469
Walsall Corporation ..	,, 15	764	1,043	+ 279	37	36,605	+ 5,504
Walthamstow U.D. Coun. ..	,, 15	894	1,109	+ 215	37	40,039	+ 5,089
Warrington Corporation	Nov. 26	524	701	+ 177	35	19,506	+ 2,037
West Ham Corporation	Dec. 6	2,971	3,692	+ 721	35½	131,840	+ 15,311
Wigan Corporation ..	,, 13	1,601	2,142	+ 541	37	74,326	+ 11,574
Yorkshire (West Riding)	,, 16	1,630	2,057	+ 427	50	106,740	+ 19,050

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War:—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., Hull, London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Dec. 16	£53,833	£53,904	50	£2,601,726	+ £40,507
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo (4 wks)	Oct. 7	3,390	3,560	28	22,118	+ 3
Brazilian Traction (Mirs.)	Oct.	7,262,000	8,006,000	43	76,436,000	+ 6,023,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Oct.	445,263	491,964	17	1,842,476	+ 146,817
Buenos Aires Lacroze ..	Nov.	39,133	39,679	21	189,575	— 1,214
Burmah Tram. & Light Rs.	Nov.	26,824	27,761	18	109,598	+ 4,844
Calcutta .. .. Rs.	Dec. 8	72,961	71,342	49	3,338,317	— 1,525
Cape Town	Oct.	14,238	17,128	..	..	..
Carthagena and Herrerias	Nov.	2,252	3,932	47	45,142	+ 17,751
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
East India	Nov.	1,942	871	17	5,174	— 3,893
Hong Kong .. .. $	Oct. 20	12,695	13,031	42	571,942	— 38,885
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Nov.	3,140	3,741	47	44,357	— 2,042
Lima	Nov.	33,608	37,466	47	397,198	+ 26,199
Lisbon .. .. Escu	Oct.	203,955	249,406	..	..	..
Madras .. (2 weeks) Rs.	Nov. 30	29,664	33,914	47	765,562	+ 70,392
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	Sept.	141,286	157,761	..	..	..
Montevideo	Nov.	28,404	31,060	4	31,060	+ 2,656
Pernambuco	Dec. 9	3,554	4,691	48	189,710	+ 38,210
Peruvian .. .. $	Nov.	925,820	1,034,790	21	4,987,180	+ 472,530
Port Elizabeth	Oct.	3,131	3,885	..	..	..
Rangoon	Nov.	5,033	5,358	47	55,379	+ 1,975
Shanghai .. .. $	Oct. 3	24,953	28,458	..	..	..
Singapore .. .. $	Oct. 27	12,617	12,357	43	555,376	+ 12,549
Toronto .. .. $	Oct.	907,460	1,043,886	43	9,934,998	+ 1,021,774
Winnipeg .. .. $	Oct.	278,817	301,722	43	2,733,516	— 6,765

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THE

Tramway & Railway World

Vol. XLII. No. 32] LONDON, SATURDAY, DECEMBER 29, 1917. [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

TO MAKERS OF STEAM TRACTORS.

The Metropolitan Asylums Board invite tenders for the supply and delivery to Caterham Asylum, Caterham, Surrey, of one five-ton steam tractor and three six-ton trailers, in accordance with specification prepared by Mr. T. Cooper, M.Inst.C.E., Acting Engineer-in-Chief.

The form of tender, contract, and specification may be inspected at the Office of the Board, Embankment, E.C.4., on and after 10 a.m. on Saturday, December 22, 1917, and then can be obtained upon deposit of £1. The amount of the deposit will be returned only after the receipt of a bona-fide tender.

Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 5 p.m. on Thursday, January 10, 1918.

By order,
T. DUNCOMBE MANN,
December 15, 1917. Clerk to the Board.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive Tenders for the supply, delivery, and erection of Rotary Converter or Motor Converter Plant.

Specifications and Forms of Tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Engineer and Manager, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m., on Wednesday, January 16th, 1918.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
December 22nd, 1917. Town Clerk.

TIPPERARY UNION.

Electric Lighting Plant.

The Board of Guardians of the above-named Union invite Tenders for the supply of a New Battery in connection with the above. Detailed specification can be obtained on application to Mr. J. P. Tierney, M.I.C.E., Consulting Engineer to the Board of Guardians, at 44, Kildare Street, Dublin, on lodgment of a sum of one guinea, which will be refunded on receipt of a *bona fide* tender.

The Guardians also require an estimate for the complete overhaul of their existing Gas Engine, which has a capacity of 12-15 h.p., and is of Messrs. Capel's make. This overhaul shall consist of the complete renewal of all valve gear and the taking up of all bearings and moving parts, leaving the engine in a perfectly tight working condition. The engine can be inspected at any time at the Workhouse, Tipperary.

Tenders, which can be for either of the above sections, or both, are to be addressed to the "Chairman, the Board of Guardians, Tipperary Union," and will be received up to the hour of 2 o'clock p.m., on Friday, 11th January, 1918. Tenders will be considered at meeting to be held on Saturday, 12th January, 1918.

By order,
Temporary Offices: JOSEPH GUBBINS,
61, Main Street, Tipperary. Clerk of Union.
8th December, 1917.

POSITIONS VACANT.

FOREMAN PLATELAYER.

Wanted, for a Tramway System, comprising 10 miles of single track, an experienced Foreman Platelayer.

Applicants must have had a wide experience in both Constructional and Maintenance work of the most modern type. Apply stating age, present employment, previous experience, and wages required, to The BOROUGH ENGINEER, Guildhall, Swansea.

ASSISTANT ENGINEER.

Wanted at once, Assistant Engineer to take entire charge of Car Sheds and Overhead Equipment of Tramways. A knowledge of Permanent Way repairs an advantage. Reply, stating age, experience, wages required, and when free, to the

Manager,
Sunderland District Electric Tramways,
Fence Houses.
Co. Durham.

MAINS ASSISTANT.

Wanted for period of war, possibly permanent appointment, Assistant for Distribution Department duties. Previous experience of A.C. mains system essential.

Apply, stating age, experience, and salary required, to BOROUGH ELECTRICAL ENGINEER, Electricity Works, Dover.

SHIFT ENGINEER.

Shift Engineer wanted for low-tension three-wire supply with batteries.—Applicants, who must be ineligible or of low category, to state salary required less any bonus that may be given.—Apply, ELECTRICAL ENGINEER, Electricity Works, Bexhill.

THE LANCASHIRE ELECTRIC POWER CO.

The above Company require a Shift Engineer; salary £17 per month. Permanency.

Applications to be sent to the undersigned as soon as possible: M. H. ADAMS, Resident Engineer, Power Station, Radcliffe, Manchester.

Handy Man wanted for Car Repair Works; must have had previous tramway experience.—State age, experience and wages required, and enclose copies of testimonials, RHONDDA TRAMWAYS, Porth, Glam.

"The most comprehensive and illuminating work on the subject we have seen."—*The Daily Telegraph.*

DEPRECIATION & WASTING ASSETS

AND THEIR TREATMENT IN COMPUTING ANNUAL PROFIT AND LOSS

By P. D. LEAKE,

Fellow of the Institute of Chartered Accountants in England and Wales; Fellow of the Institute of Directors; Fellow of the Royal Statistical Society.

Particular attention is directed to a chapter on Depreciation and Controlled Establishments under the Munitions of War Act, 1915; and it may be added that the views of the Ministry of Munitions as to the proper treatment of Depreciation of Plant coincide with the views advocated in this work.

In demy 8vo, 10/6 net, cloth, 257 pp.

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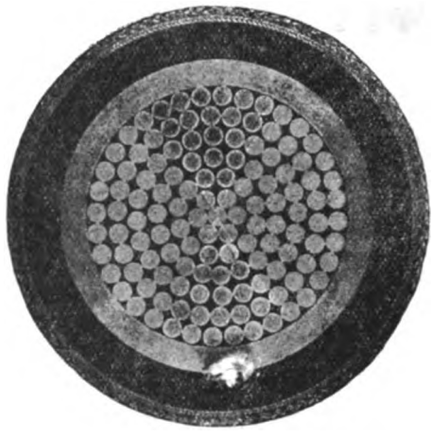

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THE
Tramway and Railway World

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SATURDAY, DECEMBER 29, 1917.

A NATIONAL ELECTRIC POWER SUPPLY.

A SAVING of 55,000,000 tons of coal per annum out of the present consumption in Great Britain for power purposes of 80,000,000 tons is the prospect held out by the interim report issued last Monday of the Coal Conservation Sub-Committee of the Government's Reconstruction Committee. The report is of engrossing interest, and should be carefully studied by everyone concerned in electric traction and, indeed, by every ratepayer. The saving is to be effected by putting the business of the generation of electrical energy on a proper footing in the light of scientific, technical, and commercial knowledge. At present electric power distribution is carried out by over 600 authorities, most of them having only small generating stations. The report proposes that the whole of this absurdly wasteful system should be swept away, and that the entire country should be supplied by about sixteen great stations erected in the most suitable localities, away from crowded areas, equipped with very large, and therefore economical, generating units, and feeding into main distributing systems. In this way, power could be supplied for all purposes at prices much lower than anything hitherto known. The Minister of Reconstruction recognises that issues affecting municipalities are raised in the report, and these are to be explored by the Government before any action is taken. It may be noted that a report will also be issued by the Board of Trade Committee on Electric Supply. The whole problem, which is of vast importance to the industries of the country, closely concerns railways and tramways, and upon a solution of it will depend the possibility of their proper extension and development. One feature which is brought out in the report is that municipalities frequently charge more for power to their own tramways and public lighting services than they do for private supply. Yet the load factor in the two first cases is at least as good and often better than in the latter. The reason why a lower price is charged for private supply is that without it no power business would be done at all, and the public services have to be charged too high to make up the loss on the private services. The fact is—and we put forward this contention a long time ago—that the tramways are made to pay for other services which are run at a loss. In our issue of November 15 last, we published particulars of the present and pre-war prices per unit charged to a large number of municipal tramways in this country. In all cases the charge is well over a penny, and in some cases it is more than twopence. Compare this with the North East coast of England, which is supplied by great power companies. A wide area, a varied load, a large and economical scale of production result in power being sold at less than a halfpenny per unit. The Sub-Committee making the report are in favour on the whole of having a controlled company in each of the sixteen districts for carrying on the generation, transmission, and main distribution of electricity. They discuss other methods, and, of course, it is quite possible that in suitable areas a combination of local authorities in the shape of a joint board would be practicable. In such a big undertaking, however, the push and vigour of private enterprise cannot lightly be ruled out. In any event, the hundreds of little tin-pot electric stations in the country will have to go. The business must be put on a business footing for the benefit of every industry. Both capital and labour would profit. The extreme municipalists, with the absurd Electric Lighting and Power Company Acts and the Tramway Act behind them, will no doubt try to prevent a change, so as to bolster up their own little local supply shops, but they will have to learn that man was not made for municipal enterprise, but that municipal enterprise was made for man. Cheap electric power is essential to the future prosperity of the country, and whether it is obtained by public or private initiative is a matter of comparatively little importance.

GAS TRACTION.

RESTRICTED TO ESSENTIAL PURPOSES.

The Board of Trade has announced that, with the concurrence of the Petroleum Executive, it has been decided that the use of gas for motor vehicles is to be brought under the same regulations and restrictions as the use of motor spirit. It is stated that the reasons for this step are the serious position resulting from the deficiency of tonnage and the probability that circumstances may at any time arise which will require a further reduction of the supplies of petrol available for civilian purposes, and the urgent necessity of reducing to the absolute minimum the expenditure of labour and materials for other than war purposes. Its object is to provide that, to the extent that gas may be available, it shall be used only for essential needs in substitution for petrol, with the object of reducing the consumption of the latter wherever practicable and of conserving stocks.

It is recognised that a certain number of vehicles have already been fitted for the use of gas, and, wherever possible, permits will be granted in these cases to enable such vehicles to be used for essential purposes, as indicated by the Motor Restriction Order. It is not intended to prohibit the use of gas for motor-vehicles in so far as, subject to other considerations, it may be purchased, but only to confine its use to the purposes stated. The best methods of the adaptation of gas for driving motor-vehicles, and questions relating to the safeguards against any danger attending its use, are the subject of investigation by Mr. Walter Long's Committee on Gas Traction.

It is proposed to issue shortly a new Order consolidating and amending the present Motor Spirit Restriction Orders, and the regulation of gas will be dealt with in the new Order.

SPEED OF GAS CONTAINER TRAILERS.

The Local Government Board has issued an Order relieving for the period of the war and 12 months thereafter heavy motor-cars drawing a "gas container trailer" from the restriction to a speed not exceeding five miles an hour to which they would be otherwise liable. The trailer must be used solely for carrying a bag or other receptacle for gas, must not exceed a weight unladen of 15 cwt., and must have all its wheels fitted with pneumatic tires or tires made of a soft or elastic material.

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BOARD OF TRADE TRAMWAY COMMITTEE.

ORDER IN COUNCIL.

It was announced in the *Gazette* dated December 25 that the following new regulation has been added to the Defence of the Realm Regulations :—

"The Board of Trade, for the purpose of making the most efficient use of the materials or plant belonging to a tramway or light railway undertaking with a view to the successful prosecution of the war, may by order require the whole or any part of the rolling-stock, materials and plant, including permanent way, of any such undertaking to be placed at their disposal or at the disposal of any person or body of persons named by them. Where any such order has been made the Board or any such person or body of persons may take possession of such portions of the rolling-stock, materials or plant of such undertaking as they may require, and may remove them and make use of them for the purposes of any other tramway or light railway."

MR. JAMES DALRYMPLE'S APPOINTMENT.

As announced in our last issue, the Board of Trade has invited Mr. James Dalrymple to join the Tramways (Board of Trade) Committee. On Monday the Glasgow Tramways Committee considered the invitation of the Board of Trade and gave the requisite permission to Mr. Dalrymple to act as a member of the Committee. The Committee now consists of the following members :

James Devonshire (*chairman*), managing director, London United Tramways, Ltd., the Metropolitan Electric Tramways, Ltd., etc.
James Dalrymple, general manager, Glasgow Corporation Tramways.
A. R. Fearnley, general manager, Sheffield Corporation Tramways.
A. L. C. Fell, general manager, London County Council tramways.
J. B. Hamilton, general manager, Leeds Corporation Tramways
R. J. Howley, joint manager, British Electric Traction Company, Ltd.
J. M. McElroy, general manager, Manchester Corporation Tramways.
Stephen Sellon, consulting electrical engineer.

LANCASHIRE AND CHESHIRE TRAMWAYS PROMISE LOYAL SUPPORT.

A meeting of representatives of municipal tramways of Lancashire and Cheshire was held in Manchester, on Friday, December 21, Alderman Linsley, chairman of the Salford Tramways Committee, presided, and representatives from the following municipalities attended :—Ashton, Accrington, Birkenhead, Blackburn, Blackpool, Bolton, Burnley, Bury, Chester, Darwen, Manchester, Oldham, Preston, Rochdale, Salford, Southport, Stalybridge, Hyde, Mossley, and Dukinfield Joint Tramway Board, Stockport, Wallasey, Warrington, and Wigan.

The secretary (Mr. J. Barnard) read a circular letter from the general manager of the Liverpool Corporation Tramways which had been circulated to most of the municipal tramways suggesting that an emergency or vigilance committee should be established to protect municipal interests in connection with the duties of the National Tramways Committee. Mr. J. M. McElroy (Manchester) gave a full explanation of the negotiations with the President of the Board of Trade, and the action taken by the Executive Council of the Municipal Tramways Association in the matter.

The following resolution was proposed and carried unanimously : Resolved—That this meeting of representatives of municipal tramways authorities of Lancashire and Cheshire having heard the explanation by Mr. McElroy, hereby approve of the action of the Executive Council of the Municipal Tramways Association, and of their selection of members to serve on the National Tramways Committee, and promise their loyal support to such Committee in the work delegated to them, and also that the best thanks of the meeting be given to Mr. McElroy for his efforts in this matter.

WAGES AND WAR BONUSES.

Croydon Corporation, at its last meeting, decided to increase the war bonuses now paid to tramway employees by 5s., the increase to take effect as from December 1. The total weekly war bonuses that will then be payable to the several grades are as follows :—Inspectors and regulators, 12s.; motormen and male conductors, 10s.; women conductors, 7s. 6d.; depot staff, men over 21 years of age, 12s.; women, 8s. 6d.; permanent clerical staff, 12s.

The Wages Committee of the Aberdeen Town Council have decided to grant to women drivers and conductors an advance in wages of about 4s. 6d. a week. This increase will leave the relative difference between the pay of the men and women employees the same as it was previous to the last advance to the men.

Brighton Tramways Committee have granted an increase of 1d. an hour in the scale of pay of the tramway employees, and a bonus of 5s. per week to the administrative and clerical staff who are in receipt of not more than £250 per annum.

The application of the Newport Corporation tramway employees for an advance in wages of 75 per cent. above the pre-war rates has been referred to the Committee on Production.

Immediate application is to be made on behalf of the tramway workers to 19 authorities in Lancashire and Cheshire for a further advance in wages of 10s. a week. Advances of 12s. a week for males and 9s. for females have already been received.

SAFETY FIRST IN CANADA.

The Ontario (Canada) Safety League has been issuing publications drawing the attention of the public to the necessity for more care in avoiding accidents. The following is a typical bulletin, of which some ten thousand copies were distributed, with special reference to accidents between street cars and motors :—

COLLISIONS.

To Motorists :—We need your assistance in preventing collisions between automobiles, street-cars and other vehicles.

The following are a few suggestions :

1. Before you cross an intersection look both ways, and keep your car under perfect control.
2. When using the track allowance keep a sharp lookout for street cars following.
3. Use extra care when driving out of lanes or alleyways—the law places the limit at 4 miles per hour.
4. If forced to stop on the track behind a standing street car keep at least ten feet away—the trolley car may have to back.
5. Look out for the street car alongside, which may turn to the right at an intersection.
6. Remember that an automobile can be stopped in much less distance than a street car, and bear in mind also that a street car cannot turn from its tracks to avoid a collision. Above all remember that a few seconds delay may avoid a serious accident.
7. Watch for pedestrians passing in front of a street car while you speed to pass, particularly at intersections.

Yours for greater safety,

ONTARIO SAFETY LEAGUE.

PROSPECTIVE EXTENSIONS.

Liverpool Corporation have received the consent of the Local Government Board to borrow £52,000 for mains to be laid in the Aintree and North End districts.

Swansea Corporation Electricity Committee have resolved to apply to the Local Government Board for sanction for a loan of £42,000 for extensions.

Luton Town Council have received a report from the electrical engineer on the urgent need for the extension of the electricity works buildings and for additional plant to meet the increasing and prospective demands. The estimated cost is £50,000.

MISCELLANEOUS NEWS AND NOTES.

London United Tramways Bill.—A number of the Councils through whose districts the London United Tramways run have decided to oppose the Bill which the company are promoting in the present session.

New Generating Station at Blackburn.—Blackburn Corporation have appointed a special sub-committee to consider the advisability of proceeding with the construction of the new generating station at Whitebirk.

New Light Railway.—The Clitheroe Rural District Council has approved of a proposal to build a light railway from Longridge to Hellifield. The line will cross the Council's road six times, and there will be four level crossings.

Fare Revision in East London.—The East Ham Tramways Committee propose to abolish return fares on certain routes, and to ask the West Ham Council to abolish return fares on routes where there is through running.

Women Drivers at Hull.—Hull Corporation Tramways Committee have resolved that in view of the great difficulty of finding suitable men as drivers, women should be employed for the period of the war as and when vacancies occur.

Steel Tires for Tramcars.—The makers of tires for tramcars, have decided that in consequence of the increase in the cost of labour, fuel, etc., the price of steel tires for tramcars for the quarter ending March 31, 1918, will be advanced £2 10s. per ton.

Tramcar Shortage in Germany.—Owing to lack of rolling-stock in Germany, the military authorities have seized large numbers of tramway cars in Munich, Strassburg, Mayence, and other towns to be used for military transport, thereby depriving these towns of their tramway services.

Parcels Traffic at Hull.—A scheme for carrying tradesmen's parcels by the tramcars has been approved. The Tramways Committee will accept ordinary responsibility as carriers, but the parcels will be put on and taken off the cars by the officials of the Food Control Committee.

Rotherham Car Leaves the Track.—A Rotherham car running between Maltby and the borough got out of the control of the motorman on December 19, left the track, and collided with a wall alongside the highway. The car was considerably damaged, and a few persons were slightly injured.

Neglecting a Police Signal.—A Rotherham Corporation motorman was fined 10s. for neglecting to obey a signal made by a constable who was on traffic duty in High Street. Defendant drove his car along the single line, and was met by a descending car, traffic thereby becoming blocked.

Derailment at Stalybridge.—A tramcar belonging to the Stalybridge, Hyde, Mossley and Dukinfield Tramways and Electricity Board jumped the points at the Town Hall, Stalybridge, on December 19, and ran for a distance of 20 yards into Market Street. The vehicle swayed heavily, but fortunately it did not overturn, and no passengers were injured.

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Liverpool Employees' Thrift Society.—According to Alderman Russell-Taylor, chairman of the Tramways Committee, the Tramway Employees' Thrift Society has funds amounting to £40,000, and in two instances the benefits are better than those given under the National Insurance Act.

Mischievous Boys.—At Birmingham four boys were fined 10s. each for stealing electric bulbs from the dashlights of tramcars on the Pershore Road route. A boy of 12 was sent to an industrial school till he reached the age of 16 for stealing a packet of coppers from the conductor's box on a Lodge Road car.

Appeal to Coke Consumers.—The Board of Trade states that there are now ample supplies of coke at the gas works in the metropolitan area. Consumers are requested to take advantage of the position to complete their stocks of coke under their requisitions by placing immediate orders for their requirements.

Timber Export Licences.—In view of the necessity for conserving supplies of timber, the *Times* reports that export licences will probably be granted even more sparingly than at present. The fact that timber may have been cut up or prepared will not in itself constitute sufficient grounds for the granting of export licences.

Private Bills in Parliament.—The total number of petitions for private Bills deposited for the ensuing session is 58, compared with 30 in the 1917 session. The number of Provisional Orders is 28, compared with 17. Petitions for additional Bills, deposited on December 18, include one relating to the Yorkshire Electric Power.

Women Employees at Doncaster.—The Doncaster Corporation now employ 30 women as tramcar drivers and 42 as conductors, Only 17 men drivers remain. Three women are employed as ticket checkers. Women were first employed in the service as conductors in 1915 and as drivers in February, 1916. Their services have so far proved satisfactory.

Electric Vehicles Wanted at Southend.—At the last meeting of the Southend Town Council it was reported that the Local Government Board had refused to sanction the loan of £4,150 for the purchase of electric vehicles for the collection of house refuse, etc. It was resolved that a communication be addressed to the M.P. for South-East Essex with a view to the Treasury being again approached in the matter.

Safety and Comfort Maxims.—Mr. W. J. McCombe, manager of Hull Corporation Tramways, has prepared a list of "Safety and Comfort Maxims," which are exhibited in the cars. A local newspaper, after praising the excellent working of the tramways despite the difficulties raised by the war, states that the publication will be a veritable charter of comfort for the passengers and a saving help for the motormen and conductors.

Swiss Railway Electrification.—By the Swiss budget a credit of twelve million francs has been sanctioned for the electrification scheme of the St. Gothard railway. Power stations at Ritorn and Amsteg are in course of construction. It is estimated that plant of 500,000 horse-power will be needed for a complete scheme covering all the Federal railways, but at present only two lines are electrically operated, while the conversion of the St. Gothard railway is in hand.

Australian Zinc Concentrates.—Sir Albert Stanley, President of the Board of Trade, in a written reply to Sir J. Harmood-Banner, states that arrangements have already been made for the treatment of a quantity of the Australian zinc concentrates, with the view of producing sulphuric acid and spelter, at works to be erected at Avonmouth, and negotiations for the treatment of further quantities at Widnes and possibly elsewhere are in progress; but no suggestion for this treatment in Norway has been made.

Christmas Holiday for Bristol Employees.—Bristol Tramways and Carriage Company suspended all their services on Christmas Day in order to give their employees an opportunity of spending the day in their homes. With the increasing number of munition workers and the depletion of the staff, the work of the company's employees had become more arduous, and it was felt that any inconvenience that would be occasioned would probably be accepted cheerfully. In order to provide absolutely necessary transport, the company ran a number of taxicabs.

Singular Accident at Oldham.—An unusual accident recently occurred on the Oldham Corporation tramways, in which a motorman took some points at an excessive speed, and was thrown off his car with a jerk, leaving the car running under power. There was, fortunately, a car standing a short distance in front, with which the unattended car collided. The front of the latter was badly smashed, but no passengers were injured. The motorman who was thrown off the car was taken to the infirmary, but was subsequently able to proceed to his home.

Opposition to a London Tramway Improvement.—Westminster City Council has been recommended by the Works Committee to refuse consent to the proposed construction of a loop line at the tramway terminus at Vauxhall Bridge Road. The London County Council desire to construct a single line of new tramway by way of Gillingham Street and Wilton Road, in order to do away with the dead end near Victoria Station, and thus to relieve the present congestion of traffic there. It is urged by the committee that the extremely congested and already very dangerous condition of the length of roadway between Victoria Street and the entrance to Victoria Station is such that the construction of such a tramway could not be viewed without the very strongest objections being raised. As the last meeting of the London County Council, Mr. G. H. Hume, chairman of the Highways Committee, said that, owing to the objection of the Commissioner of Police, it was not considered desirable to proceed with the scheme.

Tramways and Light Railways Association.—The Journal of this Association for December contains a complete list of members, who number 415, including 136 companies. The judgment given by Judge H. M. Sturges, K.C., at Preston, in the action of H.M. Postmaster-General v. the Blackpool and Fleetwood Tramroad Company, is reported at length. This judgment, as previously mentioned in these columns, was in favour of the Tramroad Company. Liberty to apply for stay of execution and leave to appeal was given to the Postmaster-General.

Government Control of American Railways.—A *Times* telegram states that President Wilson has issued a proclamation taking possession and assuming control of all railways and transportation systems in the United States as from noon yesterday (Friday). Mr. McAdoo has been appointed director-general of railroads, with full power to possess, control, operate, and utilise the transportation systems of the country. President Wilson states that he has exercised the powers granted to him by an Act of Congress of August, 1916, because it had become imperatively necessary for him so to do.

Subsidence of a Tramway at Stalybridge.—Early in the morning of December 14, the roadway in Wakefield Road, Stalybridge, gave way under the tramway track, and all traffic was consequently stopped. It appears that the subsidence occurred over the railway tunnel, but the latter seemed to be unaffected. The borough surveyor, Mr. J. M. White, and his staff at once began work on the road, with a view to maintaining the passage on each side of the tramway track for vehicular traffic. It was stated that it might be necessary to go to a depth of 40 ft. in order to find the seat of the trouble.

Good Traffic Receipts at Belfast.—Belfast Corporation tramway returns for the month of November show an increase of £5,500, the total receipts for the month being £30,363. The traffics were the largest per day and per mile in the history of the system. The increased revenue was earned on a slightly smaller car mileage than in November of last year. The revenue for the month was 14·19d. per car mile, and this was the first occasion upon which the receipts reached 14d. The surplus for the month was, however, only £800. The working expenses were £4,000 higher than in November, 1916, when there was a deficiency of £500.

Earlier Hours at Brighton.—Mr. W. Marsh, the tramways engineer and manager, has reported to the Brighton Tramways Committee that he has communicated with the proprietors of various theatres and other places of amusement suggesting that the performances should commence half an hour earlier, in order that the tramcars could cease running at an earlier hour. The proprietors had agreed to adopt the proposal on condition that the hotels and boarding houses should alter their dinner-hour. The Committee requested the manager to communicate with the secretary of the Brighton Hotel Association and others, in order to carry out the arrangement if possible.

Tramway Accident at Pittsburg.—A telegram to the *Times* reports that on Christmas Eve a serious accident occurred at Pittsburg. One of the new type of low-built steel tramway cars with centre doors, filled with belated Christmas shoppers, became unmanageable in a tunnel which connects the business district with the South Hills. The car dashed right through the tunnel at a high speed and left the track as it emerged. It then overturned and slid on its side along the street. A telegraph pole shaved off the roof of the car and the passengers were thrown into adjacent shop windows. Nine women and five men were killed, and of the hundred remaining passengers none escaped serious injury.

Difficulties at Derby.—Recent stoppages in the tramway service have been occasioned by shortage of electric power. Alderman Wilkins, chairman of the Electricity Committee, writing to a correspondent, says that they have had an exceedingly anxious time. "To be in the boiler house with sixteen huge boilers using up about 100 tons of slack per day, seeing the vile dust being fed into the boilers, and in spite of the greatest care the steam pressure going down, was terribly trying." They had, however, brought pressure to bear upon the Government, and had got some better stuff allocated to them. He hoped they had sufficient to mix with their poor supply to enable them to keep the cars going.

Bradford Tramways and Housing.—A housing scheme that will doubtless involve tramway extensions at Bradford was referred to at a conference of Yorkshire, Derbyshire, Notts, and Lincoln local authorities held under the auspices of the National Housing and Town Planning Council. Councillor E. J. Smith mentioned that the Corporation had come to the conclusion that they required 10,000 additional houses, including provision for the rehousing of 3,000 people at present living in other houses. It was intended to deal with the problem on somewhat unusual lines. They proposed to erect on the outskirts of the city ten self-contained villages of a thousand houses each.

Edinburgh and Queensferry Tramway.—At a meeting of Linlithgow County Council on December 18, the Linlithgow District Committee reported they had had various alternative plans laid before them of the proposed Edinburgh to Queensferry tramway, but until a plan was definitely submitted to them they could not reach a decision. Mr. James F. Macdonald, Linlithgow, urged that the County Council should take the initative, and state which route they preferred. The Chairman said the scheme, when prepared, would be sympathetically considered, but it was difficult to pass judgment upon it now. After discussion, it was agreed to refer the matter to the District Committee, who are to report to the County Council.

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Tramway Traffic and Army Wagons.—After what happened in Newcastle County Court recently, the *Northern Mail* thinks that drivers of military vehicles should be inclined to treat the Corporation tramways with more respect. On successive days the Corporation won two actions for damages inflicted on cars by army wagons, and in each case the evidence indicated that army drivers failed to understand sufficiently that civilian traffic has its rights. Our contemporary rightly points out that special care and skill are required to operate heavy motor vehicles in and out of crowded streets in which there is tramcar traffic. The mobility of the cars is, of course, limited, as they travel on a fixed track.

Transport Workers' Wages.—The joint demand by the various unions of vehicle workers for a minimum increase of £1 per week on pre-war wages will be considered at a national conference of employers and workers, to be held at the Ministry of Labour on January 2, under the chairmanship of Sir George Askwith. Although some transport workers are already receiving wages up to, and even over, the minimum demanded—as, for instance, the Liverpool carters, who are now being paid 23s. above, and the railway carters, who under their new arrangement will be paid 21s. above pre-war wages—others have obtained only 9s., and it is mainly for the benent of the lower-paid sections that the conference is being held.

Birkenhead Patriotic Collections.—Mr. Cyril Clarke, general manager, and the staff of Birkenhead Tramways Department, with the aid of a few outside workers, continue with unabated enthusiasm the task of collecting on the cars for patriotic objects. During the three weeks ended December 8 the amount raised for the Cheshire Field Company, R.E., and the 4th Cheshire Regiment was £82. A three weeks' appeal is now in progress for comfo ts for wounded men in the local hospitals. Whenever it is thought desirable, the appeals are assisted by the running of a decorated car. Recently such a vehicle in the guise of a "tank" was used for the sale of war bonds and war savings certificates, with the result that a week's propaganda realised £6,220.

Success of the Penny Fare Scheme at Plymouth.—The re, ort of the general manager of Plymouth Corporation tramways, presented at the last meeting of the Council, on the working of the tramways for the four weeks ended December 8, showed for the first time a comparison with the record for a period of 1916 in which the system of universal penny fares was in operation, as the new scheme came into force on November 9 last year. During the four weeks covered by the manager s last report, the passengers totalled 1,931,679, and the traffic receipts amounted to £8,035 12s. 2d. Those figures compared with 1,591,881 and £6,610 9s. 1½d. respectively in the 1916 return, and showed the remarkable increase for the four weeks of 339,793 passengers and £1,425 3s. 0½d. receipts.

Light and Leading for Tramway Managers.—If tramway managers are not sufficiently instructed as regards the exigencies of car driving, it cannot be said to be the fault of the makers of newspapers. In a recent issue, for instance, an editorial writer in an electrical contemporary thus admonishes them. "Tramway managers must surely know by now that the driving of a tramcar is somewhat arduous work . . . . . Also considerable experience is necessary before it can be said that a driver can take a car on any route with safety. In our opinion, if the young men must join the colours, then the Government must see to it that the.e is a sufficient supply of older men to carry on the minimum tramway service that is required." We are glad to observe that, although managers are credited with scarcely as much knowledge of the work of a driver as any schoolboy would possess, the responsibility for the present condition if affairs is placed, not on their shoulders but upon the Government, where it undoubtedly belongs.

Complaints Against Conductors.—In several towns it is complained that women conductors are given to drawing the chain across the platform before a car is full, even when they are informed there is room on the top deck. A correspondent suggests that women are either unable to gauge the accommodation available, or they are too indolent to deal with a full complement. A dangerous proceeding was recently seen on the part of a woman conductor at Vauxhall Station, London. An intending passenger got on the step of a car which had no chain up, whereupon the conductor came from the lower saloon, cried out "full up," signalled the car forward, and affixed the chain. The passenger was left to either jump off a car rapidly gaining speed, or to hang on until a stop was reached. Another complaint is that on reaching a terminus the trolley arm is swung round before the passengers are off, the darkened staircase being a source of danger. At the West Norwood terminus of the London cars this practice is alleged to be common.

A Remarkable Propnecy.—We are indebted to Mr. T. B. Goodyer, manager of the Croydon Corporation tramways, for a copy of an interesting paper entitled "Trams and Trolleys," read before the Kit-Kat Club of Columbus, Ohio, by Mr. W. K. Pomerene. In his introduction, Mr. Pomerene refers to a practical treatise on railways published in 1839 by Lieutenant LeCount of the British Navy, in which the writer made this prophecy: "We have no hesitation in saying that electro-magnetism will at no distant day compete with steam as a motive power, and successfully." By 1840 several patents had been issued in this country covering the use of rails for carrying electric current. The greater part of Mr. Pomerene s paper is taken up with a discussion of the modern idea of street railway franchise, i.e., the terms of the concessions under which private enterprise is permitted to own and operate tramways in the United States. Some comparison is made between the tramway conditions in America and European cities. The writer does not think that the conditions are suitable for municipal tramways in America, and he refers to the opinion given by Mr. James Dalrymple (whom he describes as one of the ablest men in tramway work in the British Isles) after an investigation of the Chicago tramway situation, that with political conditions as they were in the United States, municipal ownership and operation would be hopeless.

Charging of Electric Vehicles.—Much of the advantage of the electric vehicle lies in the fact that it is "trouble proof." There is nothing in the equipment of the car to get out of order, except the batteries, and the possibility of any difficulty here is remote if the owner takes reasonable care to note the mileage that the car is capable of running at any hour of the day without further charging. The greatest satisfaction is obtained from the electric vehicle when the batteries are charged under the direct supervision of the driver of the car. The latter condition presupposes that there is a charging apparatus in the garage of each car or van owner. Manufacturers have expended a good deal of effort to make a battery-charging apparatus which is at the same time economical to buy and simple and automatic in its operation. The *Canadian Electrical News* of Toronto says that the mercury rectifier appears to fulfil the first requirement, but it gives more or less trouble often at a time when it is most needed. The alternative seems to be to fall back on a motor generator set, and this is probably the type of apparatus that is in greatest favour with electric car owners.

Attempt to Defraud the Dublin Tramways Company.—A case was heard at the Dublin City Court on December 14, when Rosanna M'Dermott was indicted for attempting to obtain from the Dublin United Tramways Company the sum of £15 18s. by pretending that she had deposited a suit case containing articles of clothing with the company for delivery. Evidence was given by several employees of the company that she claimed the sum mentioned for the non-delivery of a suit case which she alleged she brought from Kings Bridge railway station and deposited in the parcels office of the tramway company for delivery at an address in Lower Buckingham Street. The accused was unable to identify any of the assistants as the person to whom she gave the case, and the tramway company had no record of receiving it. The prisoner, who pleaded not guilty, stated that she came from Clough Jordan to Dublin with a suit case and a bundle, but did not know where to go. She gave a wrong name, because she did not want her father to know where she was. The prisoner, against whom there were three previous convictions, was found guilty and sentenced to six months' imprisonment in the second division.

Budapest Tramway Service Discontinued.—A telegram from Budapest, via Zurich, states that in consequence of the shortage of coal the Budapest tramways will discontinue their services for three weeks, and for the same reason all industrial establishments in Hungary will be shut down from December 22 to January 3. The Budapest tramways are of interest as being the first electric conduit tramways. They were constructed from 1889 to 1893 by Messrs. Siemens and Halske, and an illustrated account of the original installation was given in THE TRAMWAY AND RAILWAY WORLD of February, 1894. The conduit is egg-shaped, 13 ins. high and 11 ins. wide, and is supported at intervals of 3 ft. 10 ins. by square cast iron frames. When opened, the line potential was maintained at a pressure of 300 volts. The average speed attained has been stated as 6 miles an hour in the narrower streets, 9½ miles in wider streets and 11 miles in the suburbs. The late Dr. John Hopkinson, in his evidence before the Joint Committee of 1893 on the protective clauses to be introduced into electric tramway bills, stated that the actual cost of construction of the Budapest tramways was £4,000 per track mile.

No Christmas Service at Manchester.—Every effort was made to induce the Manchester employees to carry on the service for at least a part of Christmas Day, but without success. Mr. T. M'Kerrail, an officer of the Chief Industrial Commissioner's Department in London, went to Manchester at the request of Sir G. Askwith, and on Sunday met the executive of the Tramway and Vehicle Workers' Association. He was also in touch during negotiations with Mr. J. Barnard, secretary of the Lancashire and Cheshire tramway authorities. Although it was thought at one time that a way out of the difficulty would be found, the employees, both men and women, finally declined to work the cars. There was consequently no service on Christmas Day, and a large number of munition workers were obliged to walk to and from their work. Public spirited citizens made use of their motor cars to carry soldiers on leave. The service was resumed on Wednesday. As indicating the extent to which the tramway service is normally used in Manchester on Christmas Day, it is stated that last year 369,625 passengers travelled on the cars.

There were no tramway services on Christmas Day in Bolton, Bristol, Burnley, Birmingham, Cardiff, Halifax, Sunderland, and a few other towns.

PERSONAL.

Mr. T. J. Bennett, C.I.E., has been appointed a director of the Bombay, Baroda, and Central India Railway.

Sir John Wolfe Barry, owing to advancing age, has decided to relinquish his position as chairman of the Eastern and Associated Telegraph Company.

Captain B. F. B. Hargreaves, who has been officially reported as missing, was chief accountant of the Blackpool and Fleetwood Tramroad Company.

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Mr. J. P. Tierney, of Dublin, has been retained by Cork Corporation to report on the city electric lighting plant.

Mr. W. Greenwood has been appointed temporary third engineer in charge of the Ilford Council's station, at a salary of £150 per annum and war bonus.

Mr. G. P. Malling, who recently resigned the position of chief inspector of the Rawtenstall tramways to take up a post on the Blackpool tramways, has been presented with a gold watch by the Rawtenstall tramway employees. The presentation was made by Mr. C. L. E. Stewart, the manager.

Mr. E. J. Jennings.—At a meeting of the City of Birmingham Electric Supply Committee it was decided to recommend to the Council that Mr. E. J. Jennings, secretary and accountant of the Marylebone Lighting Committee, be appointed secretary. The two other candidates selected from over 600 applicants were Messrs. H. P. Conibear, of the South Lancashire Tramways Company, and W. M. Wright, of the London Underground and suburban group of companies.

Our readers will learn with regret that **Mr. Richard Thomas Kingham** died at Eastbourne in December. Mr. Kingham joined the London General Omnibus Company in 1855, and was secretary for thirty years until 1908 when the amalgamation took place with the London Road Car Company and the Vanguard Motor Omnibus Company. Mr. Kingham was in charge of the advertising department of the London General Omnibus Company for several years prior to his retirement in 1912, and was very well known to advertising men. In his earlier days Mr. Kingham was a prominent Freemason, being a member of Lodge No. 4.

FINANCIAL REPORTS AND MEETINGS.

The Midland Rubber Company report a profit of £21,142, and announce a dividend at the rate of 7½ per cent. on the "A" ordinary shares, and a like dividend on the "B" ordinary shares. A balance of £13,139 is carried forward.

Manila Electric Railroad and Lighting.—The accounts for 1916 show net earnings of $758,654. After providing for fixed charges, placing $43,783 to sinking fund, and $80,000 replacements and renewals, and paying 6 per cent. dividends, surplus $918,430, and reserve accounts $762,309.

The National Steam Car Company's report for the year ended October 31 last states that the profit, after the usual deductions, was £35,059. For the renewal of omnibuses, £13,931 is carried to a special reserve; a dividend of 6 per cent. is declared; and £14,435 is carried forward; but against this there is special taxation for the three years ended October 31 last, of which the amount has not yet been ascertained.

L.C.C Traffic Receipts—The traffic receipts for the week ended December 26 amounted to £50,328, an increase of £9,856, as compared with the corresponding period last year. The route mileage was 141·67, the same as a year ago. From April 1 (the commencement of the financial year) to December 26 (thirty-eight and a half weeks) the total receipts were £2,139,506, an increase of £288,611, on the corresponding period of 1916.

Railway Stockholders' Fears.—At a private meeting of stockholders of the Scottish railways, representing over £15,000,000 of stocks of all kinds, held in Glasgow, an Association was formed, to be called the Scottish Railway Stockholders' Protection Association, its object being to take steps to safeguard and protect the interests of Scottish railway shareholders at the conclusion of war. Mr. W. F. Russell, who presided, said the position of railways after the war looked perilous from a stockholder's point of view.

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Copies can be obtained from THE TRAMWAY AND RAILWAY WORLD Offices, Amberley House, Norfolk Street, W.C.

Import of Stocks and Bonds.—A proclamation published in the *Gazette* of December 21 prohibits the importation into the United Kingdom of all bonds, debentures, stock or share certificates, scrip and other documents of title relating to any stocks, shares, or other securities; with the exception of matured bonds redeemable in the United Kingdom, and coupons falling due for payment in the United Kingdom. The prohibition does not apply to any such goods imported under Treasury licence.

Advertising of Controlled Firms.—In order to remove misconceptions, the Ministry of Munitions states that no arbitrary rule has been formulated in reference to the advertising expenses of controlled establishments. In dealing with such establishments for the purpose of munitions levy, it has been the practice of the Ministry to make full allowance for advertising on a pre-war basis; and, while it is possible that cases may arise in contracts with the Ministry in which advertising charges would have to be more or less disregarded owing to the particular contract basis, such charges are in general treated as part of the legitimate establishment charges of the firm. All such cases are dealt with separately on their merits.

Foreign Investments.—An Order of Council, dated November 27, appears in the *Gazette* of December 21, containing an additional Defence of the Realm Regulation which provides that a person resident in the United Kingdom shall not, without permission in writing from the Treasury, send any remittance out of the United Kingdom for the purpose of subscribing to any loan or issue of capital outside the United Kingdom; or purchasing stock, shares, or securities, or other property than merchandise, if not in the United Kingdom; or purchasing any foreign currency to be held with a view to appreciation in value or as an investment. A banker is required to obtain a declaration in writing as to the purpose for which the remittance is proposed to be sent before any such remittance is despatched from the United Kingdom.

Galway Tramways Company's Petition.—The Irish Master of the Rolls has reserved judgment on the petition by Galway and Salthill Tramways Company asking for a winding up order. The capital is £35,000, in £10 shares, and the amount paid up £15,990. The tramway runs from Galway out to the suburb of Salthill, about two miles distant, and is one of the few horse lines in Ireland. It was constructed 39 years ago, and the rails have ever since been in use. The assets consist of the rolling-stock, nine horses, and the usual accessories. The debts amount to £359. The company, by reason of want of capital, was unable to carry on business, and no further capital could be obtained. If the assets were now realised, the directors said, they would be more than sufficient to pay all liabilities. The petition was opposed by Mr. P. J. McCarthy, secretary and manager, and a number of shareholders, who asserted that there was no reason for winding up, and that no notice had been given of a meeting to pass a winding up resolution.

Newport Corporation Tramways.—The annual report shows that the traffic receipts were £50,010, compared with £44,201 10s. in the previous year. There was an increase in the number of passengers of 1,439,015. At the end of the year there was a credit balance of £8,610 10s. carried to renewals fund account. On the electric supply account there was a deficiency of £273 13s., compared with £993. Councillor Robjent, in speaking on the accounts at the Corporation's December meeting, suggested that in future the accounts should be circulated for a longer period before the meeting at which they were presented. There were one or two matters he should like discussed, but he was chary of discussing any matter upon insufficient information. He would only say that there seemed to be an enormous sum for capital expenditure. It seemed to him, although they had larger gross revenue every year, the expenditure had risen in undue proportion. Councillor J. Moxon explained that owing to the shortness of staff they had been unable to get out the accounts earlier. He asked them to look at the business in the light of a commercial undertaking. The capital written down was £171,000, and the gross profit on the electricity undertaking this year was £22,000. He did not think that was altogether a bad result. He referred to the increased cost of coal, labour, and materials generally. Of the profit of £22,000, £13,000 was absorbed by sinking fund, and £9,310 in interest. Councillor Colborne mentioned that large sums had to be written off every year for depreciation. He was pleased to see a cash balance, and that a portion had been put aside for renewals. Councillor Moxon said that £8,000 had been spent on maintenance, and a sum had been carried forward for renewal work.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of thirty-eight of the principal tramway undertakings in the United Kingdom for the week ended December 15 give total receipts of £193,778 or £38,519 more than in the corresponding week of last year. The total length of track included in the returns was 2,029 miles.

The receipts this year were at the rate of £95 10s. 1d. per mile of single track, and last year at the rate of £76 10s. 4d., thus showing an increase for the week of £18 19s. 9d. per mile open. Certain London and provincial tramways have temporarily discontinued the publication of traffic receipts.

Fares at Rawtenstall.—Rawtenstall Town Council propose to approach the Board of Trade with a view to an increase in fares.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS PREV.	DIVIDENDS LAST.	NAME.	PAID.	PRICE, JULY 27, 1914.	CASH Dec. 27 or previous.	A WEEK AGO
5%	5%	Alabama Traction 5% 1st Mt. ..	—	67	67½	69
2/9	2/9	Anglo-Argentine 5½% 1st Pref.	5	4⅞	52/6	50/-
2/9	2/9	Do. 5½% Cum. 2nd Pref. ..	5	4¼	42/-	46/3
4%	4%	Do. 4% Deb.	100	91	69½	70⅝
4½%	4½%	Do. 4½% Deb.	100	98½	70	69⅝
5%	5%	Do. 5% Deb.	100	96	65	66⅞
—	—	Associated Omnibus Co., Ord. ..	5/-		1/3	1/3
7d.	1/-	Auckland Elec. Trams. Ord. ..	1	1	20/-	20/-
5%	5%	Do. 5% 1st Mt. Deb. ..	100	102⅝	90½	90½
7%	7%	Barcelona Trac. 7% Pr. Lien ..	100	—	102½	102½
—	1/-	Bath Electric Trams Pref. Ord.	1	¼	4/-	4/-
6d.	6d.	Do. 5% Cum. Pref. ..	1	⅛	11/-	11/-
4½%	4½%	Do. 4½% 1st. Mort, Deb. ..	100	72½	71½	71½
4½%	4½%	Birmingham Dist. Pwr. and Tract. Co. 4½% 1st Deb. ..	100	84½	77½	77½
14/-*	20/-*	Bombay Elec. Sup. & Tram Ord.	10	14	20½	20½
6/-	6/-	Bombay El. Sup. and Tram. 6% Cum. Pref.	10	11⅜	9⅞	9⅞
4½%	4½%	Do. 4½% Deb.	100	96	77	77
5%	5%	Do. 5% 2nd Mt. Deb. ..	100	100	88½	88½
$1	$1	Brazilian Trac. & Power Ord. ..	$100	66	44⅜	45
$1½	$1½	Do. 6% Cum. Pref. ..	$100	97	89½	89
1/-	1/-	Brisbane Elec Trams. Ord. ..	5	7½	£6/15/9	£6/15/9
2/6	2/6	Do. 5% Cum. Pref. ..	5	5	82/6	82/6
4½%	4½%	Do. 4½% 1st Deb. ..	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ..	100	107	29½	29½
6%	5%	Do. Pref. Ord.	100	106	29½	29½
5%	5%	Do. 5% Cum. Pref. ..	100	103	42½	42½
4½%	4½%	Do. 4½% 1st Mt. Debs. ..	£40	99½	82½	82½
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	56½	57½
£3*	£3*	Brit. Elec. Trac. Ord.	100	—	31½	32
6%	6%	Do. 6% Cum. Part. Pref.	100	—	71½	72½
5%	5%	Do. 5% Deb.	100	92	77½	77½
4½%	4½%	Do. 4½% 2nd Deb. ..	100	77½	65	65
5%	5%	B. A. Lacroze 5% Mt. Deb. ..	100	100	73½	73½
6/6*	2/6	Calcutta Tramways Ord. ..	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref. ..	5	5⅛	81/3	81/3
4½%	4½%	Do. 4½% 1st Deb. ..	100	99½	74	74
1/-*	1/-*	Cape Elec. Trams.	1	⅛	12/3	12/3
1/3	1/3	City of B. A. Trams	5	5½	82/1½	82/1½
4%	4%	Do. 4% Deb.	100	97½	70	70
5%	5%	Colombo Elec. Tram. & Ltg. Co. 5% 1st Mort. Deb.	100	95	85	85
5%	5%	Co. F.C. do. Jardin Botanico 5% 1st Mort. Bds.	100	93½	82	82
5%	5%	Costa Rica Elec. Lt. & Trac. Co. 5% 1st Deb.	—	63½	60	60
4/-	4/-	Dublin United Trams. Ord. ..	10	8	7½	7½
6/-	6/-	Do. 6% Pref.	10	12	10⅛	10½
—	—	Hastings & Dis. Elec. Tram Ord.	10/-		-/9	-/9
1/2⅝*	1/2⅝*	Do. 6% Cum. Pref. ..	1	1/16	9/3	9/3
4½%	4½%	Do. 4½% Deb.	100	67½	50½	50½
1/1½	5½d.	Hong Kong Tramway	5/-	1/16	17/1½	17/1½
5%	5%	Do. 5% Deb.	100	87½	80½	80½
2/6	3/-	Isle of Thanet 5% Pref. ..	5	2½	19/9	19/9
4%	4%	Do. 4% Deb.	100	73½	44⅜	44⅜
5%	5%	Kalgoorlie Trams 5% A. Deb. ..	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/4½	2/4½
6/6	6/6	Lanarkshire Trams Co.	10	10½	9⅞	9½
5%	5%	Lancs. Un. Trams 5% Pr. Ln.	100	85½	71	71
5%	5%	Lisbon Elec. Trams 5% Mt. Debs.	100	95	79½	79½
9⅝d.*	9⅝d.*	Llandudno & Colwyn B. Ord.	1	—	10/-	10/-
—	4½	London & Sub. Traction Ord. ..	1	⅜	2/3½	2/3½
6d.	6d.	Do. 5% Pref.	1	⅛	7/-	7/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ..	100	75½	62	61½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	81½	81½
5%	5%	Do. 5% Inc. Deb... ..	100	88½	79½	80
4%	4%	Lon. Unt. Trams. 4% 1st Mt. Db.	100	55	35	35
3/-	3/-	Madras Elec. 6% Pref. ..	5	5 1/16	85/-	85/-
5%	5%	Do. 5% Deb.	100	100	87½	87½
7½d.%	9⅜d.*	Manaos Trams & Ltg. Ord. ..	1	9/32	3/11	3/11
5%	5%	Do. 5% 1st Deb.	100	77	71	71
$1½	$1½	Manila Elec. R. R. & Light ..	$100	102	72	72
4½%	4½%	Met. Elec. Trams. 4½% Deb. ..	100	85½	71½	71½
5%	5%	Do. 5% Deb.	100	87	80	80
$1½	$1½	Mexico Trams. Common ..	$100	70	31	31
5%	5%	Do. 1 Mt. 5% G.B. ..	—	84	32	35
—	—	Do. 6% Mt. Bds. ..	100	76	36	36
4½%	4½%	Montreal St. 4½% Stg. Dbs. ..	100	100	91½	91½
4½%	4½%	Do. 4½% Stg. Debs. (1922)	100	99	88½	88½
5%	5%	Montreal Trams. Co. 5% Gld. Bd.	—	103	98½	98½
1/2½*	2/-	National Steam Car	1	1/32	18/9	19/9
9½d.*	9½d.*	New General Traction	1	⅛	7/3	7/3
8½d.	9½d.	Northern Gen. Trans. Ord. ..	1	1/32	12/9½	12/9½
6/-*	3/-	Para Elec. Rlys. Ord.	5	4½	81/3	81/3
5%	5%	Do. 5% 1st Deb. ..	100	89½	74½	74½
—	—	Pernambuco Tram. & Power Ord	1	—	6/6	6/6
—	—	Do. 7% Non. Cm. Part Pf.	1	—	12/-	12/3
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	—	—
7½d.*	8½d.*	Potteries Elec. Trac. Ord. ..	1	1/32	6/7½	6/7½
6d.	6d.	Do. 5% Pref.	1	1/32	11/9	11/7½
1/4	8d.	Provincial Trams. Ord. ..	1	¼	20/3	20/3
3/-	3/-	Rangoon Tram. 6% Cum. Pref.	5	5½	88/9	88/9
5%	5%	Rhondda Trams. 5% 1 M. Deb.	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35 ..	—	97½	86	87
5%	5%	Do. 1st Mt. 5% 50 yr. ..	100	89½	75½	76
5%	5%	Sao Paulo Deb. 5% 1st Mt. ..	$500	99	87½	87½
5%	5%	Do. 5% Perp. Deb. ..	100	99½	74	74
12/-	10/-	Shanghai Elec. Cons.	10	13	14½	14½
3d.	3d.	Singapore Elec. Trams. ..	5/-	¼	4/7	4/7
4%	4%	Sou. Met. Elec. Tram & Ltg. 4% Db	100	66	49	49
5%	5%	S. Elec. Trams. of B.A. 5% Mt. ..	—	100½	88	88
4½%	4½%	Toronto 1st Mt. 4½% Bds. ..	100	98	91½	91½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	77½	77½
2/-	2/-	Un'd. El. Tr. Monte Video Ord.	5	4½	50/-	50/-
4½%	4½%	Winnipeg El. 4½% Deb. ..	100	94½	66	66
—	—	Yorks (W.R.) Elec. Trams. Ord.	5	⅛	18/3	18/3
3/-	3/-	Do. 6% Cum. Pref. ..	5	⅛	84/7½	84/7½
4½%	4½%	Do. 4½% 1st Deb.	100	85½	77	77
—	—	Metropolitan Dist. Ord. ..	100	21½	15	15
—	—	Undgd. Elec. Rys. of London ..	10	21½	30/-	32/-
		Do. "A"	1/-	⅜	5/-	5/1½
4½%	4½%	Do. 4½% Bds. of 1933 Rd.	—	99	102½	102½
6%	6%	Do. 6% 1st. Cum. In. Db.	100	114	102½	101½
4%	4%	Do. 6% In. Bonds 81 ..	—	88½	80½	80½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS

NAMES.	Week ended	Latest Return. 1916	1917	Incr. or Dec.	Aggregate. Wks.	1917	Incr. or Dec.
Aberdare U.D.C. ..	Dec. 4	393	455	+ 62	35	15,673	+ 1,384
Aberdeen Corporation ..	,, 19	1,805	2,016	+ 211	29	62,736	+ 6,988
Ayr Corporation ..	,, 22	268	333	+ 65	32	15,809	+ 1,706
Belfast City	,, 21	5,972	7,311	+ 1,339	38	247,112	+ 29,940
Birkenhead Corporation	,, 23	1,593	1,929	+ 336	38½	70,402	+ 11,089
Birmingham Corporation	,, 15	13,018	19,588	+ 6,570	37	683,287	+ 92,255
do. Motor Omnibuses ..	,, 15	859	1,180	+ 321	37	39,251	+ 1,918
Blackburn Corporation ..	,, 19	1,022	1,322	+ 300	38½	57,185	+ 10,000
Blackpool & Fleetwood ..	,, 8	267	362	+ 95	48	42,757	+ 775
Bournemouth Corporation	,, 26	1,898	2,264	+ 366	38½	99,630	+ 9,289
Bradford Corporation ..	,, 15	6,950	7,658	+ 708	37	286,542	+ 31,389
Bristol	,, 21	4,733	5,681	+ 948	51	277,381	+ 28,380
Burnley Corporation ..	,, 22	1,627	1,807	+ 180	..	..	..
Burton-on-Trent Cor. ..	,, 23	339	374	+ 35	38	11,986	+ 1,208
Bury Corporation ..	,, 23	1,238	1,536	+ 298	38½	63,211	+ 8,310
Chatham & District ..	,, 13	1,078	1,080	+ 2	50	63,411	+ 2,071
Cork Electric	,, 13	445	521	+ 76	50	27,532	+ 2,041
Derby Corporation ..	,, 22	1,163	1,331	+ 168	38	46,555	+ 3,027
Dublin United	,, 14	5,973	6,787	+ 814	50	336,386	+ 32,605
Dundee City	,, 19	1,341	1,492	+ 151	31½	48,439	+ 4,804
East Ham Corporation ..	,, 22	1,137	1,229	+ 92	38	52,822	+ 3,242
Exeter Corporation ..	,, 21	400	367	— 33	38	15,410	— 143
Glasgow Corporation ..	,, 22	22,941	26,074	+ 3,133	29⅔	778,211	+ 91,091
Glossop (U.E. Sup. Co.) ..	,, 22	129	159	+ 30	51	7,934	+ 878
Halifax Corporation ..	,, 18	1,815	1,995	+ 180	37⅔	93,052	+ 8,666
do. Motor Buses ..	,, 18	45	43	+ 2	37⅔	1,838	— 38
Hastings and District ..	,, 23	928	990	+ 62	51	62,703	+ 9,991
Huddersfield Corporation	,, 22	2,642	2,962	+ 320	38	122,161	+ 13,475
Ilford U.D. Council ..	,, 22	682	755	+ 73	38	29,196	+ 3,236
Ipswich Corporation ..	,, 22	459	609	+ 150	38	25,978	+ 6,143
Isle of Thanet	,, 22	251	172	— 79	12	1,921	— 1,272
Kilmarnock Corporation ..	,, 22	169	207	+ 38	31½	6,333	+ 736
Lanarkshire	,, 13	2,096	2,901	+ 805	50	138,858	+ 23,464
Lancashire United ..	,, 19	1,422	2,324	+ 902	51	120,091	+ 27,593
Leeds City	,, 22	9,449	10,863	+ 1,414	38	420,996	+ 46,292
Leicester Corporation ..	,, 22	3,552	4,248	+ 696	..	..	..
Leith Corporation ..	,, 1	830	1,059	+ 229	28½	31,025	+ 5,601
Leyton U.D. Council ..	,, 20	1,393	1,733	+ 340	38	71,619	+ 9,778
Liverpool Corporation ..	,, 15	13,685	16,863	+ 3,178	49⅔	781,358	+ 76,860
Llandudno & Colwyn Bay	,, 14	177	223	+ 46	2	437	+ 40
London County Council	,, 26	40,472	50,328	+ 9,856	38½	2,130,506	+ 288,611
Maidstone Corporation ..	,, 20	190	215	+ 25	38	9,282	+ 945
Manchester Corporation	,, 22	17,762	23,305	+ 5,543	38	792,114	+ 75,725
Nelson Corporation ..	,, 8	172	218	+ 46	36	8,507	+ 753
Newcastle-on-Tyne Cor.	,, 22	7,000	8,025	+ 1,025	38	300,471	+ 44,181
New St. Helens & Dist. ..	,, 19	849	1,220	+ 371	25	36,051	+ 8,721
Northampton Cor. ..	,, 21	781	866	+ 85	38	31,985	+ 4,523
Nottingham Corporation	,, 20	3,626	4,588	+ 962	38	168,772	+ 19,348
Oldham Corporation ..	,, 23	2,265	2,727	+ 462	39	110,483	+ 14,161
Portsmouth Corporation	,, 15	2,148	2,450	+ 302	..	..	..
Provincial	,, 22	2,093	2,394	+ 301	11⅔	27,503	+ 3,517
Reading Corporation ..	,, 13	808	1,043	+ 235	37	39,182	+ 7,292
Rhondda Tramways ..	,, 13	1,162	1,573	+ 411	50	75,342	+ 11,194
Rotherham Corporation	,, 26	1,361	1,923	+ 562	38½	70,211	+ 10,087
Salford Corporation ..	,, 24	4,756	7,080	+ 2,324	38½	254,974	+ 46,172
Sheffield Corporation ..	,, 27	9,933	12,878	+ 2,945	39	472,088	+ 59,651
Southampton Cor. ..	,, 19	1,578	2,075	+ 497	37⅔	77,752	+ 13,965
Southend-on-Sea Cor. ..	,, 19	602	639	+ 37	38	35,115	+ 997
South Shields Cor. ..	,, 8	780	934	+ 154	36	34,468	+ 3,933
Sunderland Corporation.	,, 23	1,791	2,004	+ 213	38	70,172	+ 6,699
Sunderland District ..	,, 12	594	802	+ 208	6	4,684	+ 905
Swindon Corporation	,, 19	206	263	+ 57	37½	10,242	+ 2,456
Torquay Tramways ..	,, 13	422	622	+ 199	50	33,301	+ 3,811
Tyneside Trys. & Trmrds.	Nov. 21	525	811	+ 286	21	18,921	+ 4,749
Wallasey Corporation	Dec. 22	1,247	1,450	+ 203	38½	60,626	+ 7,672
Walsall Corporation ..	,, 22	819	1,064	+ 245	38	37,669	+ 5,749
Walthamstow U.D. Coun.	,, 22	1,002	1,068	+ 66	38	47,107	+ 5,200
Warrington Corporation	Nov. 29	524	701	+ 177	35	19,506	+ 2,037
West Ham Corporation	Dec. 13	3,048	3,616	+ 568	36½	135,456	+ 15,879
Wigan Corporation ..	,, 20	1,456	2,106	+ 650	38	76,432	+ 12,224
Yorkshire (West Riding)	,, 23	1,630	2,317	+ 687	51	109,057	+ 19,737

The following Corporations and Companies have suspended the issue of their Tramway Traffic Returns during the War :—Accrington, Bath, Blackpool, Bolton, Brighton, British Electrical Federation, Cardiff, Chesterfield, Colne, Croydon, Dover, Dublin & Lucan, Glasgow Subway Co., Hull, London General Omnibus Co., London United Tramways Co., Lowestoft, Metropolitan Electric Tramways, Ltd., National Steam Car Co., Newport (Mon.), Preston, Rochdale, South Metropolitan Electric Tramways, Tramways (M.E.T.) Omnibus Co., Wolverhampton Corporation.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1916	1917	Aggregate. Wks.	1917	Increase or Dec.
Anglo-Argentine	Dec. 23	£53,083	£54,902	51	£2,656,628	+ £42,326
Auckland .. (28 days)	Oct. 26	21,428	22,308	17	92,118	+ 7,832
Ballarat and Bendigo (4 wks)	Oct. 7	3,390	3,560	28	22,113	+ 3
Brazilian Traction (Mrs.)	Oct.	7,262,000	8,006,000	43	76,436,000	+ 6,023,000
Brisbane	Sept.	32,530	31,600	39	294,840	— 2,820
British Columbia .. $	Oct.	445,263	491,964	17	1,842,476	+ 146,817
Buenos Aires Lacroze ..	Nov.	39,133	39,679	21	189,575	— 1,214
Burmah Tram. & Light Rs.	Nov.	26,824	27,761	17	109,598	+ 4,844
Calcutta .. .. Rs.	Dec. 15	72,204	71,748	50	3,410,065	— 1,981
Cape Town	Nov.	..	16,522	..	..	..
Carthagena and Herrerias	Nov.	2,252	3,932	47	45,142	+ 17,751
Cordoba	Sept.	13,313	12,463	26	82,895	— 1,588
East India	Nov.	1,942	871	17	5,174	— 3,893
Hong Kong .. .. $	Oct. 20	12,695	13,031	42	571,942	— 38,885
Kalgoorlie	July	2,521	2,713	30	18,154	+ 696
La Plata	Nov.	3,140	3,741	47	44,357	— 2,042
Lima	Nov.	33,608	37,466	47	397,198	+ 26,199
Lisbon .. .. Escu	Oct.	203,955	249,406	..	..	..
Madras .. (2 weeks) Rs.	Nov. 30	29,664	33,914	47	765,562	+ 70,392
Manila .. .. $	June	59,432	73,900	..	..	..
Manaos .. .. Rs.	Sept.	141,286	157,761	..	..	..
Montevideo	Nov.	28,404	31,060	4	31,060	+ 2,656
Pernambuco	Dec. 23	4,200	4,769	50	199,134	+ 39,884
Peruvian .. .. $	Nov.	925,820	1,034,790	21	4,987,180	+ 472,530
Port Elizabeth	Nov.	..	3,807	..	..	..
Rangoon	Nov.	5,033	5,358	47	55,379	+ 1,975
Shanghai .. .. $	Oct. 3	24,953	28,458	..	..	..
Singapore .. .. $	Oct. 27	12,617	12,357	43	555,376	+ 12,540
Toronto .. .. $	Oct.	907,460	1,043,886	43	9,934,998	+ 1,021,774
Winnipeg .. .. $	Oct.	278,817	301,722	43	2,733,516	— 6,755

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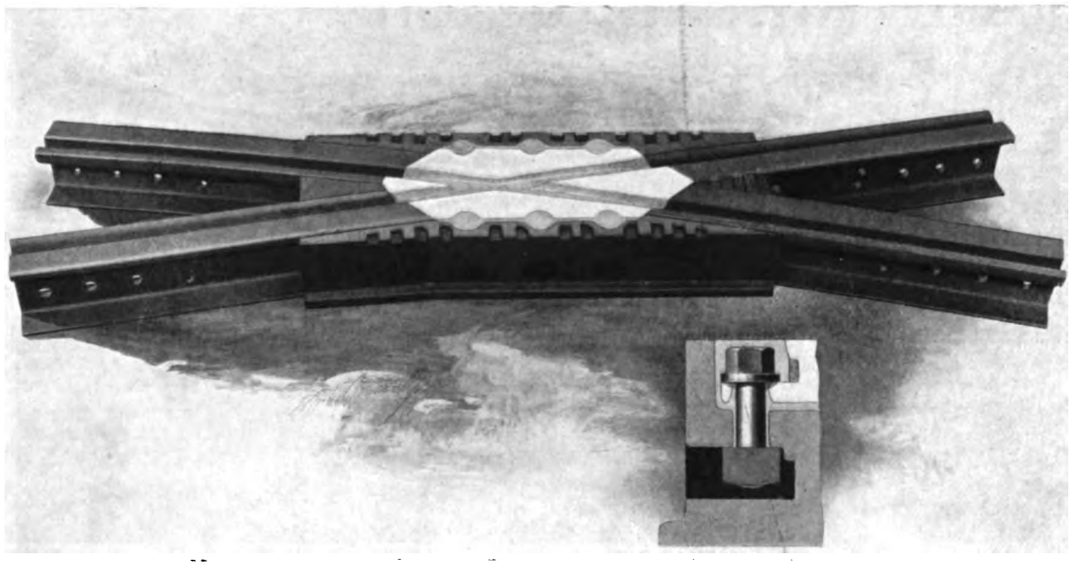

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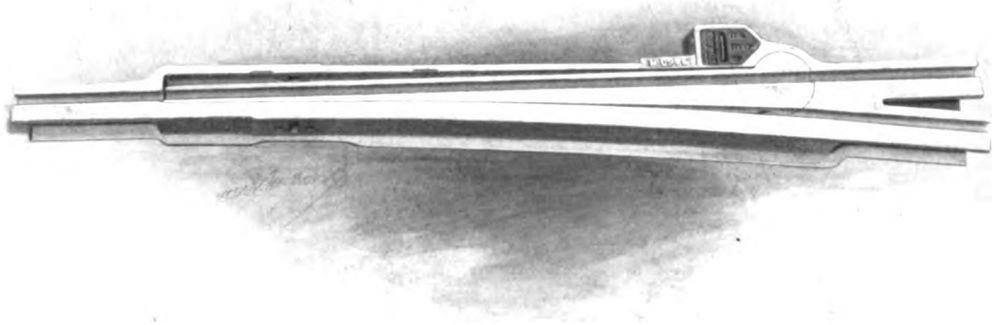

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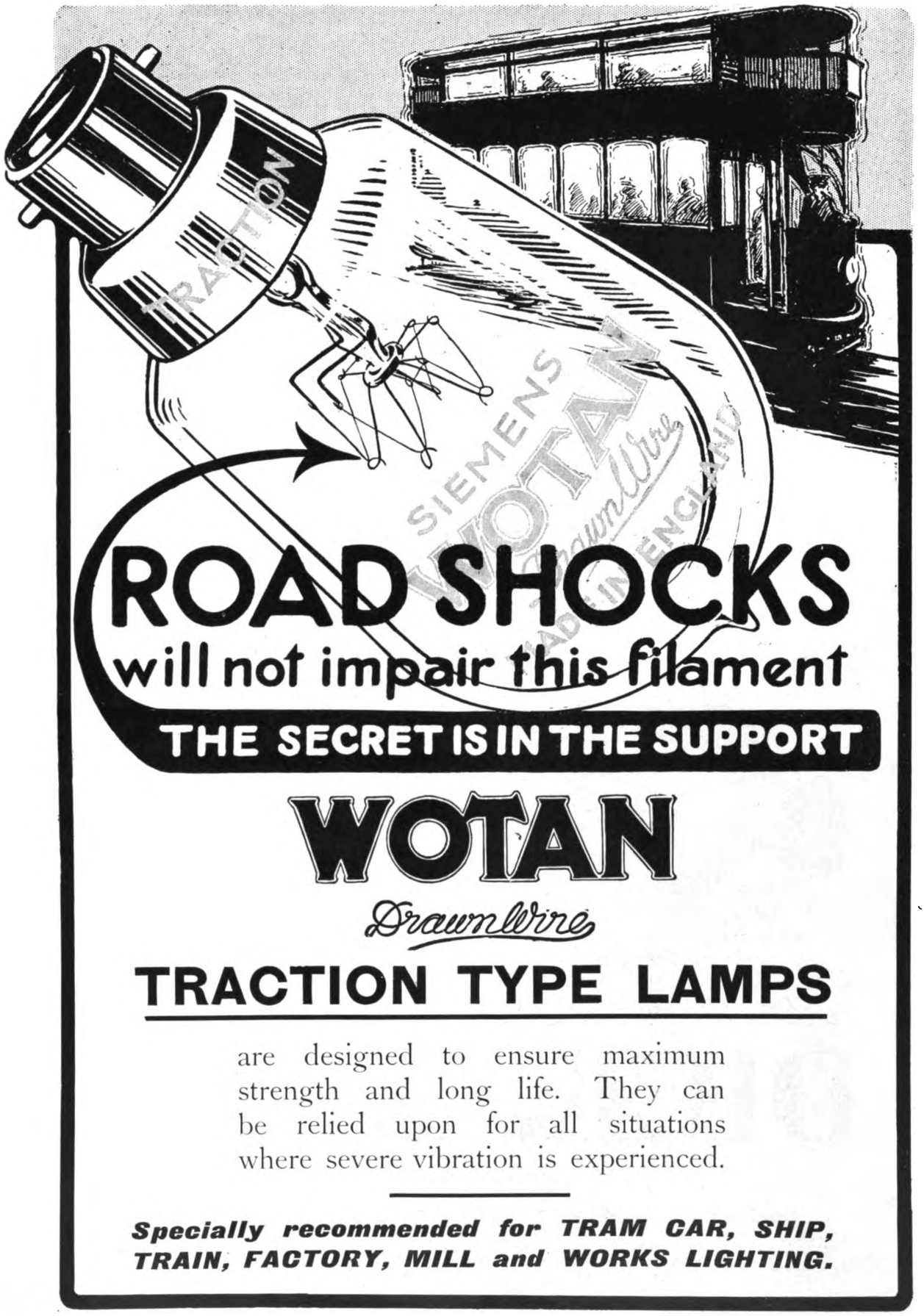

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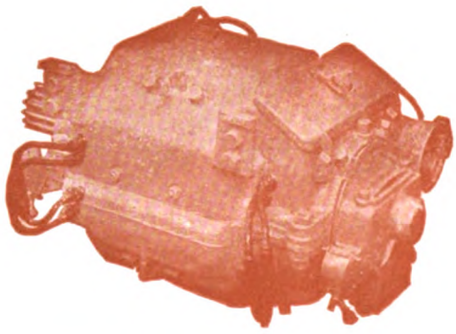

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View from commutator end.

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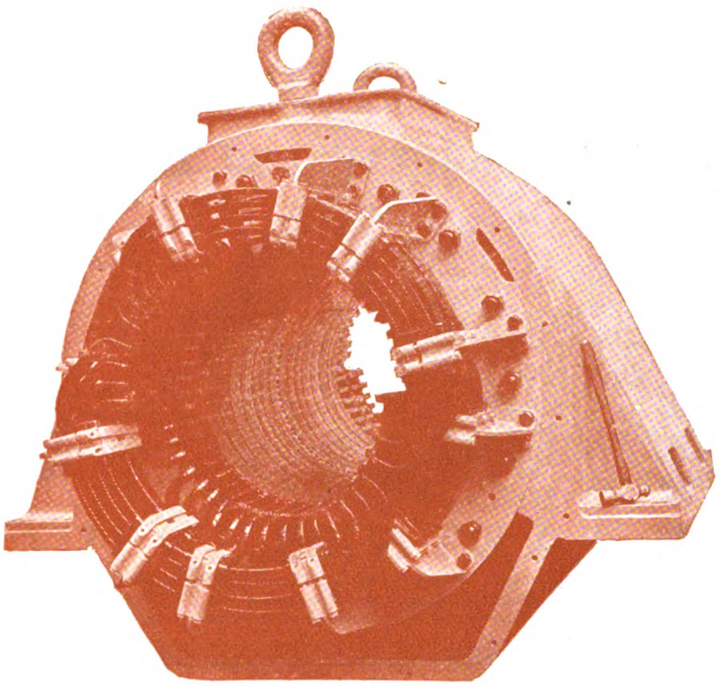

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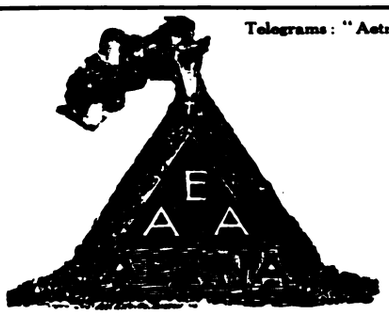

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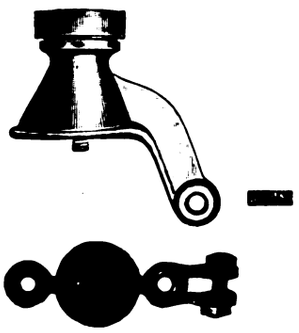

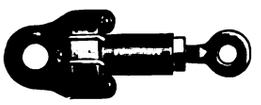

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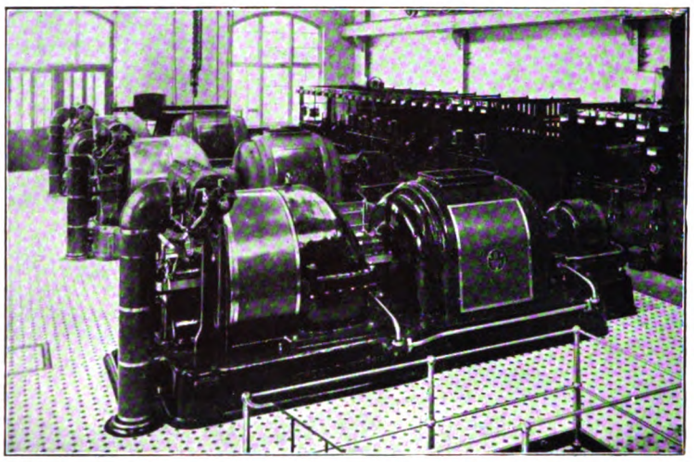

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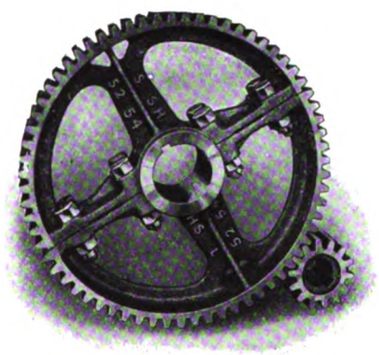

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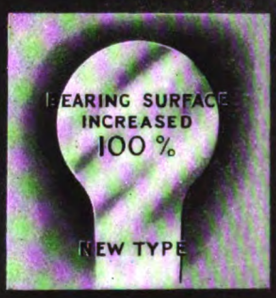

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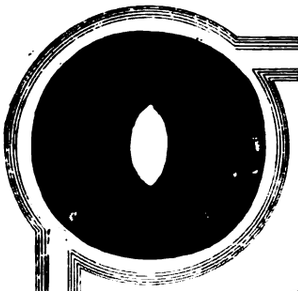

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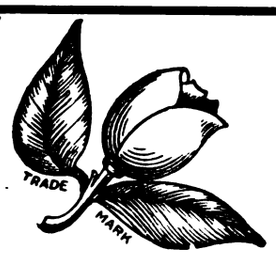

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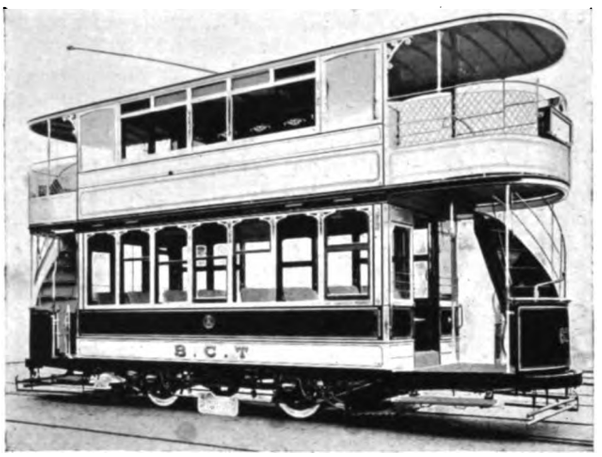

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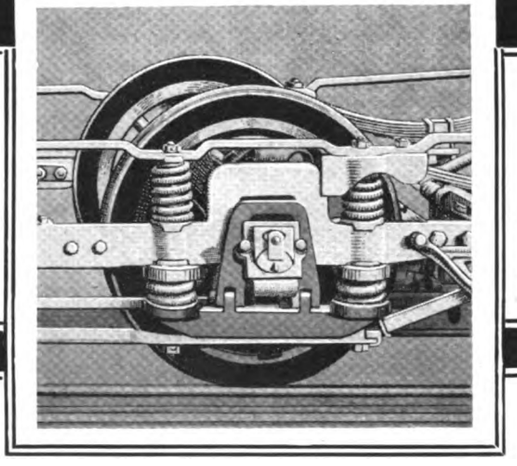

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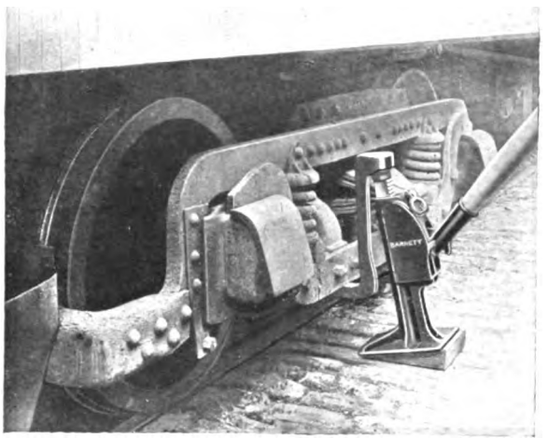

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(Continued on page xx.)

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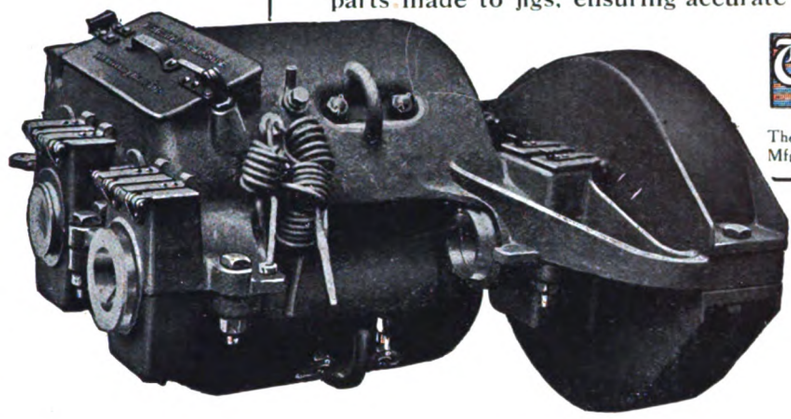

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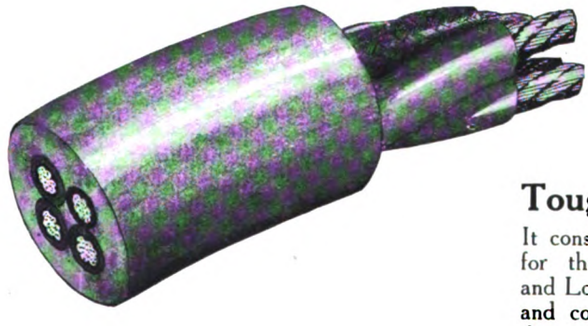

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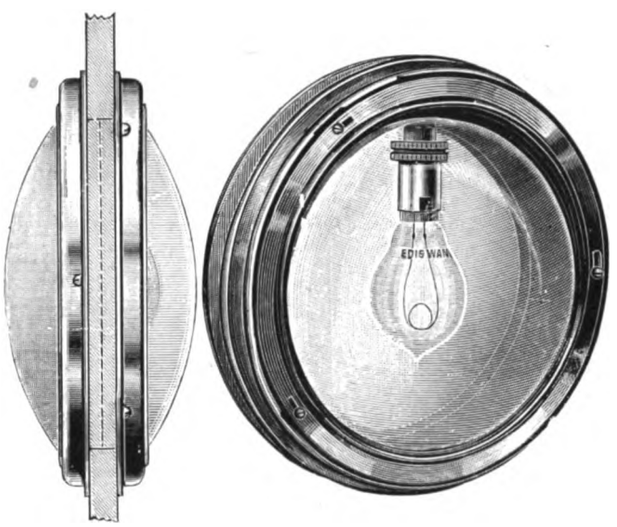

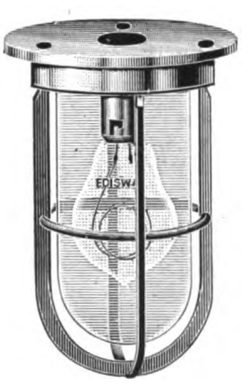

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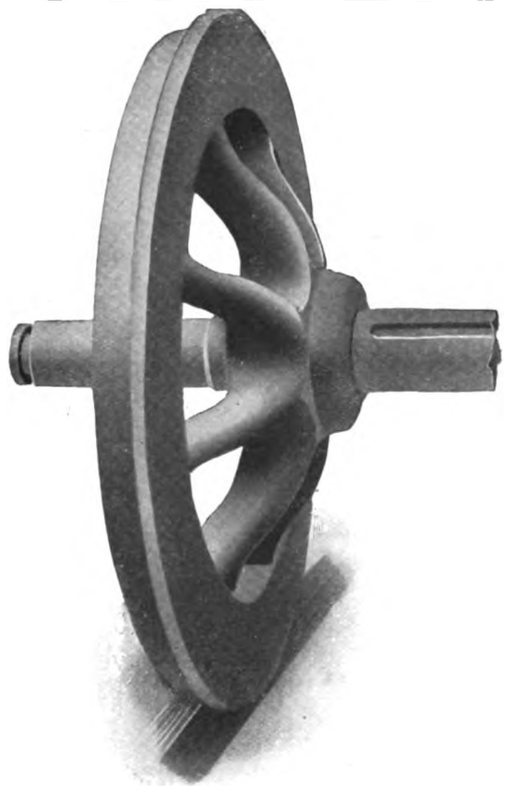

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NAMES OF PRINCIPAL OFFICERS,

POSTAL ADDRESS, TELEGRAPHIC ADDRESS, AND TELEPHONE NUMBERS.

MUNICIPAL TRAMWAYS, pp. xxiii-xxiv. COMPANY TRAMWAYS, pp. xxiv-xxvi. PARTICULARS OF TRACK AND EQUIPMENT, pp. xxvii-xxx.

TRAMWAY ASSOCIATIONS, p. xxvi.

Aberdare Urban District Tramways, Gadlys Estate, Aberdare. [T.A., Tramways, Aberdare: T.N., 17.] *Gen. Manager and Elec. Engineer*, A. J. Abraham; *Traffic Supt.*, H. King; *Chairman Try. Com.*, Coun. E. Stonelake.

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[Lines worked by Liverpool Corporation Tramways.]

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Colchester Corporation Tramways, Magdalen Street, Colchester. [T.A., Tramways, Colchester; T.N., 92.] *Gen. Manager and Engineer*, R. C. Bullough; *Chairman Try. Com.*, Coun. A. M. Jarmin; *Vice-Chairman*, Coun. J. T. Bailey.

Colne Corporation Tramways, Colne, Lancashire. *General Manager and Engineer*, T. G. Richardson; *Chairman Try. Com.*, Coun. R. Knight (Mayor).

Coventry Corporation Tramways, Priestley's Bridge, Coventry. [T.A., Tramways, Coventry; T.N., 1014.] *Engineer and General Manager*, T. R. Whitehead; *Assistant Engineer*, W. M. Milnes; *Chairman*, Coun. C. V. Pugh; *Vice-Chairman*, Coun. H. W. Wale.

Croydon Corporation Tramways, Tramways Office, Thornton Heath, Surrey. [T.A., Tramways, Croydon; T.N., 406, Croydon.] *Tramways Manager*, T. B. Goodyer; *Chairman Try. Com.*, Ald. G. J. Allen; *Vice-Chairman*, Coun. A. A. Thomson.

Darlington Corporation Tramways, Haughton Road, Darlington. [T.A., Tramways, Darlington; T.N., 2485.] *General Manager and Elec. Eng.*, J. R. P. Lunn; *Traffic Supt.*, J. Fraser; *Chairman Try. Com.*, Ald. C. W. Starmer.

Dartford Urban District Council Tramways, Dartford. *Chairman Try. Com.*, Coun. R. Bennett; *Vice-Chairman*, Coun. W. H. D. King.

[Leased. See Dartford Tramways in list of Tramway Companies.]

Darwen Corporation Tramways, Lorne Street, Darwen. [T.N., 104.] *Gen. Manager and Eng.*, F. J. S. Hosken; *Boro. Elec. Eng.*, C. H. Garnett; *Chairman Try. Com.*, Ald. Jas. Tomlinson.

Derby Corporation Tramways, 4, Victoria Street, Derby. [T.N., 410.] *Gen. Manager*, F. Harding; *Elec. Eng.*, T. P. Wilmshurst; *Per. Way Eng.*, J. Ward; *Chairman Try. Com.*, Coun. J. Dean.

Doncaster Corporation Tramways, Grey Friar's Road, Doncaster. [T.A., Rayner, Doncaster, T.N., 43.] *Manager & Elec. Eng.*, E. S. Rayner; *Chairman Try. Com.*, Coun. S. Balmforth; *Vice-Chairman*, Coun. H. M. Marshall.

Dover Corporation Tramways, Town Hall, Dover. [T.A., Trams, Dover; T.N., 294.] *Gen. Manager*, E. Carden; *Per. Way Eng.*, W. C. Hawke (Boro. Surveyor); *Chairman Try. Com.*, Coun. Barwick; *Vice-Chairman*, Coun. Norman.

Dundee Corporation Tramways, Town House Buildings, Dundee. [T.N., 1340]; *Gen. Manager and Eng.*, Peter Fisher; *Elec. Eng.*, H. Richardson; *City Eng.*, J. Thomson; *Chairman Try. Com.*, ——

East Ham (County Borough of) Corporation Tramways, Nelson Street, East Ham. [T.N., 611 and 100, East Ham.] *Gen. Manager and Elec. Eng.*, W. C. Ullmann; *Chairman Try. Com.*, Ald. M. Oakes.

Eccles Corporation Tramways, Eccles. *Elec. Eng.*, H. W. Angus; *Per. Way Eng.*, T. S. Picton; *Chairman Try. Com.*, Coun. Alexander; *Vice-Chairman*, Ald. Pearson.

[Lines worked by Salford Corporation.]

Erith Urban District Council Tramways, Tramway Depôt, Walnut Tree Road, Erith. [T.A., Tramways, Erith; T.N., 36.] *Gen. Manager and Elec. Engineer*, J. C. Williams; *Chairman Try. Com.*, Coun. G. C. Humphreys.

Exeter Corporation Tramways, Paris Street, Exeter. *Manager*, R. O. Baldwin; *Elec. Eng.* H. D. Munro; *Per. Way Eng.*, T. Moulding; *Chairman Try. Com.*, Ald. H. B. Varwell; *Vice-Chairman*, Coun. F. G. Towill.

Farnworth Urban District Council Tramways, Albert Road, Farnworth. *Chairman Try. Com.*, Coun. S. C. Steele; *Vice-Chairman*, Coun. Stanley.

[Lines leased to the South Lancashire Tramways Co.]

Glasgow Corporation Tramways, 46, Bath Street, Glasgow. [T.A., Trams, Glasgow; T.N., 1040, Douglas.] *Gen. Manager*, J. Dalrymple; *Traffic Supt.*, L. Mackinnon; *Chief Eng.*, J. Ferguson; *Elec. Eng.*, E. T. Goslin; *Sec.*, J. N. Wilson; *Chairman Try. Com.*, Coun. Montgomery; *Vice-Chairman*, Bailie Kelly.

Gloucester Corporation Light Railway, Bristol Road Depôt, Gloucester. [T.A., Tramways, Gloucester; T.N. 155.] *Gen. Manager and Elec. Eng.*, F. H. Corson; *Chairman Try. Com.*, Coun. J. O. Roberts; *Vice-Chairman*, Coun. C. J. Ramstedt.

Great Yarmouth Corporation Tramways, Caister Road, Great Yarmouth. [T.N. 265.] *Gen. Manager*, F. L. Turner; *Elec. Eng.*, Gordon Bryant *Per. Way. Eng.*, J. W. Cockrill (Borough Surveyor); *Chairman Try. Com.*, Coun. J. T. C. Salmon.

Halifax Corporation Tramways, Skircoat Road, Halifax. [T.N., 36 and 382.] *Traffic Manager*, Jas. D. Caird; *Try. Eng.*, J. W. Galloway; *Per. Way Eng.*, J. Lord (Boro. Eng.); *Chairman Try. Com.*, Ald. C. F. Spencer; *Vice-Chairman*, Ald. A. Fawcett.

Haslingden Corporation Tramways, John Street, Haslingden. *Gen. Manager and Elec. Eng.*, Barnes Kay; *Per. Way Eng.*, J. S. Green (Borough Surveyor); *Chairman Try. Com.*, Coun. Waddington; *Vice-Chairman*, Coun. Haworth.

Herne Bay Pier Tramway (owned and worked by Herne Bay U.D.C.), Herne Bay. [T.N., 22.] *Res. Eng. and Manager*, H. C. Dufton.

Heywood Corporation Tramways, Heywood, Lancs. [T.N., 47.] *Gen. Manager*, D. H. Davies; *Per. Way Eng.*, J. B. Nuttall; *Chairman Try. Com.*, Coun. J. Ashworth; *Vice-Chairman*, Ald. T. Popple, J.P.

Huddersfield Corporation Tramways, Northumberland Street, Huddersfield. [T.N., 698 and 398.] *Gen. Manager & Elec. Eng.*, R. H. Wilkinson; *Assist. Engineer*, A. P. Quilliam; *Traffic Supt.*, T. Hartley; *Borough Eng.*, K. F. Campbell; *Chairman Try. Com.*, Coun. E. H. Sellers; *Vice-Chairman*, Coun. T. Canby.

Hull Corporation Tramways, Alfred Gelder Street, Hull. [T.N., 444, Corporation.] *Manager*, Wm. J. McCombe; *Try. Elec. Eng.*, J. Wilkinson [T.N. 443, Corporation]; *Per. Way Eng.*, F. W. Bricknell (*City Engineer*) [T.N. 943, Corporation]; *Chairman Try. Com.*, Coun. W. Hakes; *Vice-Chairman*, Coun. C. Raine.

Ilford Urban District Council Tramways, Ley Street, Ilford. [T.N., 684.] *Manager and Engineer*, L. E. Harvey; *Chairman Try. Com.*, Coun. O. Waters; *Vice-Chairman*, Coun. J. Lowe.

Ilkeston Corporation Tramways, Park Road Ilkeston. [T.A., Bellamy Ilkeston; T.N., 26.] *Manager and Elec. Eng.*, L. C. F. Bellamy; *Chairman Try. Com.*, Coun. J. E. Bestwick; *Vice-Chairman*, Coun. Kane.

[These tramways have been sold to the Tramways Light and Power Co., Ltd.]

Ipswich Corporation Tramways, Constantine Road, Ipswich. [T.A., Ayton, Tramways, Ipswich; T.N., 354.] *Gen. Manager and Elec. Eng.*, Frank Ayton; *Traffic Supt.*, A. Butler; *Rolling Stock Supt.*, W. A. Fairhead; *Chairman Try. Com.*, Coun. E. C. Ransome; *Vice-Chairman*, W. P. Burton.

Kearsley Urban District Council Tramways, Council Office, Kearsley, Farnworth, S.O. *Clerk U. D. C.*, H. Martin.

[Lines leased to and worked by the South Lancashire Tramways Co.]

Keighley Corporation Tramways, South Street, Keighley. [T.A., Tramways, Keighley; T.N., 17.] *Gen. Manager and Elec. Eng.*, H. Webber; *Chairman Try. Com.*, Coun. A. Smith.

Kilmarnock Corporation Tramways Electricity Works, Kilmarnock. [T.N., 95.] *Elec. Eng. and Manager*, W. C. Bexon; *Consulting Engineers*, Kennedy and Jenkin; *Convener Try. Com.*, Coun. Lorimer.

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ELECTRIC TRAMWAYS IN THE UNITED KINGDOM.

Kirkcaldy Corporation Tramways, Electricity Works Victoria Road, Kirkcaldy. [T.A., Tramways, Kirkcaldy. T.N., 124, 174, and 175.] *Manager & Elec. Eng.*, O. F. Francis; *Traffic Manager*, Jas. Fisher; *Chairman Try. Com.*, Coun. G. Fergusson.

Lancaster Corporation Tramways, Electricity Works, Lancaster. [T.A., Milnes, Tramways, Lancaster; T.N., 1, L.] *Gen. Manager & Elec. Eng.*, G. C. Milnes; *Acting Boro. Electrical Engineer and Tramways Manager*, J. B. Patterson; *Traffic Manager*, W. T. Charlton; *Chairman Try. Com.*, Coun. T. Wilkinson.

Leeds City Tramways, Swinegate, Leeds. [T.A., Tramways, Leeds; T.N., 1230; *General Manager*, J. B. Hamilton; *Traffic Supt.*, A. Daggett; *Elec. Eng.*, John Burbridge; *Highways and Per. Way Eng.*, R. B. Holt; *Car Works Supt.*, G. E. Watmough; *Chairman Try. Com.*, Ald. R. A. Smithson; *Vice-Chairman*, Ald. H. Brown.

Leicester Corporation Tramways, 20 and 22, Humberstone Gate, Leicester. [T.N., 2177.] *Manager & Sec.*, A. F. Lucas; *Boro. & Try. Eng.*, E. G. Mawbey; *Boro. Elec. Eng.*, T. R. Smith; *Cons. Engs.*, Kincaid, Waller & Manville; *Chairman Try. Com.*, Ald. S. Flint, J.P.; *Vice-Chairman*, Ald. G. Banton, J.P.

Leith Corporation Tramways, 165, Leith Walk, Leith. [T.N., 415.] *Gen. Manager*, F. A. Fitzpayne; *Per. Way Eng.*, J. R. Findlay (*Burgh Eng.*); *Chairman Try. Com.*, Judge Hall.

Leyton District Council Tramways, Car Depot, Lea Bridge Road, Leyton, E. [T.A., Tramways, Leyton; T.N., 17 Walthamstow.] *Manager*, F. Schofield; *Elec. Eng.*, F. Harman Lewis; *Per. Way Eng.*, E. H. Essex; *Chairman Try. Com.*, Coun. F. M. Read.

Lincoln Corporation Tramways, Brayford Side North, Lincoln. [T.A., Stanley Clegg, Lincoln; T.N., 109]. *General Manager and Elec. Eng.*, Stanley Clegg; *Chairman Try. Com.*, Ald. W. S. White; *Vice-Chairman*, Coun. M. A. Ashley.

Liverpool Corporation Tramways, 24, Hatton Garden, Liverpool. [T.A., Tramways, Liverpool; T.N., 6054 and 7701, Central.] *General Manager*, C. W. Mallins; *Per. Way Eng.*, J. A. Brodie (*City Engineer*); *City Electrical Engineer*, Harold Dickinson; *Rolling Stock Supt.*, T. Ridyard; *Chairman Try. Com.*, Coun. E. Russell Taylor; *Vice-Chairman*, Ald. F. Smith, J.P.

London County Council Tramways, 62, Finsbury Pavement, London, E.C. [T.A., Lotram Ave., London; T.N., 8321, 3322, and 3323 London Wall.] *General Manager*, A. L. C. Fell; *Traffic Manager*, J. K. Bruce; *Electrical Engineer*, P. L. Riviere; *Rolling Stock Supt.*, W. E. Ireland; *Per. Way Eng.*, J. Welling; *Development Supt.*, T. E. Thomas; *Chairman Highways Com.*, G. H. Hume; *Vice-Chairman*, A. H. Scott, J.P.

Lowestoft Corporation Tramways, Norwich Road, Lowestoft. [T.N., 87.] *Gen. Manager*, H. H. Saunders; *Elec. Eng.*, W. R. May; *Chairman Try. Com.*, Coun. F. Spashett (Mayor).

Maidstone Corporation Tramways, Tramway Offices, Tonbridge Road, Maidstone. [T.A., Lambert, Tramways, Maidstone; T.N., 448] *Gen. Manager and Elec. Eng.*, A. T. Lambert; *Chairman Try. Com.*, Ald. D. T. J. Lyle; *Vice-Chairman*, Coun. Green.

Manchester Corporation Tramways, 55, Piccadilly, Manchester. [T.A., Tramways, Manchester; T.N., 7800 City.] *Gen. Manager*, J. M. McElroy; *Traffic Sup.*, J. T. Oakes; *Elec. Eng.*, J. J. McMahon; *Chief Civil Eng.*, H. Mattinson; *Rolling Stock Supt.*, G. R. Blackburn; *Chairman Try. Com.*, Ald. J. Bowes; *Vice-Chairman*, Ald. A. W. Chapman.

Middlesex County Council Light Railways, Middlesex Guildhall, Westminster, London, S.W. *County Eng.*, H. T. Wakelam, M.I.C.E.; *Chairman of Light Railways Com.*, County Ald. H. Burt; *Vice-Chairman*, County Coun. F. Goodyear.

Middleton Corporation Tramways. *Consulting Engs.*, Lacey, Sillar, and Leigh; *Chairman Try. Com.*, Ald. W. Wood, J.P. (Mayor); *Vice-Chairman*, Ald. Bentley, J.P.

[Worked by Manchester Corporation Tramways.]

Nelson Corporation Light Railways, Charles Street, Nelson. [T.N., 115.] *Manager and Elec. Eng.*, G. F. Nayler; *Per. Way Eng.*, W. Shackleton; *Chairman Try. Com.*, Coun. W. F. Cooke.

Newcastle-upon-Tyne Corporation Tramways, Manors, Newcastle. [T.A., Traction, Newcastle; T.N., 913 and 914 Central.] *Gen. Manager & Engineer*, Ernest Hatton; *Traffic Supt.*, T. Chalder; *Per. Way Eng.*, W. J. Steele; *Chairman Try. Com.*, Coun. R. Mayne; *Vice-Chairman*, Coun. A. M. Sutherland.

Newport (Mon.) Corporation Tramways, Town Hall, Newport, Mon. [T.A., Dynamo, Newport, Mon.; T.N., 990 L., Nat.] *Gen. Manager*, N. J. Young; *Boro. Elec. and Per. Way Eng.*, A. Nichols Moore; *Chairman Try. Com.*, Coun. J. Moxon; *Vice-Chairman*, Coun. F. Phillips.

Northampton Corporation Tramways, St. James', Northampton. [T.N., 279 & 280.] *Gen. Manager and Elec. Eng.*, J. F. Cameron; *Chairman Try. Com.*, Coun. T. D. Lewis; *Vice-Chairman*, Coun. W. Beale.

Nottingham Corporation Tramways, Beastmarket Hill, Nottingham. [Tramways, Nottingham; T.N., 225.] *General Manager & Elec. Eng.*, John Aldworth; *Traffic Supt.*, H. Morley; *Per. Way Eng.*, Arthur Brown (*City Eng.*); *Rolling Stock Supt.*, W. Boot; *Chairman Try. Com.*, Coun. R. H. Swain, J.P.; *Vice-Chairman*, Ald. F. R. Radford, J.P.

Oldham Corporation Tramways, Wallshaw Depot, Oldham. [T.A., Tramways, Oldham; T.N., 1495.] *Gen. Manager & Eng.*, P. Priestly; *Traffic Supt.*, J. Brierley; *Chairman Try. Com.*, Coun. Cheetham; *Vice-Chairman*, Coun. Stanbury.

Perth Corporation Tramways, 128, High Street, Perth. [T.N., 226 & 101.] *Tramways Manager*, W. G. Snell; *Elec. & Tramways Eng.*, John Lambert; *Per. Way Eng.*, R. McKillop (*Burgh Surv.*); *Chairman Try. Com.*, Coun. Calderwood.

Plymouth Corporation Tramways, 15, Ebrington Street, Plymouth. [T.N. 518, Plymouth.] *General Manager*, C. R. Everson; *Elec. Eng.*, E. J. Okell; *Chairman Try. Com.*, Ald. S. H. Phillips, J.P.; *Vice-Chairman*, Coun. J. Moon.

Pontypridd Urban District Tramways, Generating Station, Treforest, Pontypridd. [T.N. 33.] *Gen. Manager and Elec. Eng.*, J. E. Teasdel; *Traffic Inspector*, W. May; *Per. Way Eng.*, W. E. Lowe (*Surveyor*); *Chairman Try. Com.*, Coun. M. L. Jones.

Portsmouth Corporation Tramways, Town Hall, Portsmouth. [T.N., 110 Corporation.] *Gen. Manager*, W. R. Spaven; *Elec. and Per. Way Eng., and Rolling Stock Supt.*, V. G. Lironi; *Traffic Supt.*, W. Munford; *Chairman Try. Com.*, Coun. J. Timpson; *Vice-Chairman*, Ald. R. Payne.

Preston Corporation Tramways, Holmrook Road, Preston. [T.A., Corporation Tramways, Preston; T.N., 278.] *Gen. Manager and Elec. Eng.*, J. F. Simpson; *Traffic Supt.*, C. H. Manning; *Chairman, Try. Com.*, Ald. J. Ormrod; *Vice-Chairman*, Coun. T. Parkinson.

Radcliffe Urban District Council Tramways, Council Offices, Radcliffe, Lancs. *Res. Eng.*, H. Wilkinson; *Per. Way Eng.*, W. L. Rothwell; *Clerk*, S. Mills; *Chairman Try. Com.*, Coun. Walker Allen, J.P.

[These tramways are worked as part of the Bury system.]

Rawtenstall Corporation Tramways, Bacup Road, Rawtenstall. [T.N., 81 and 85.] *Gen. Manager and Elec. Eng.*, C. L. E. Stewart; *Chairman Try. Com.*, Ald. H. Coupe, J.P.; *Vice-Chairman*, Coun. J. W. Stansfield.

Reading Corporation Tramways, Mill Lane, Reading. [T.A., Tramways Manager, Reading; T.N., 330.] *Gen. Manager & Elec. Eng.*, G. F. Craven; *Chairman Try. Com.*, Ald. C. G. Field, J.P.

Rochdale Corporation Tramways, Mellor Street, Rochdale. [T.A., Tramways, Rochdale; T.N., 48.] *Gen. Manager & Eng.*, G. Webster; *Traffic Manager*, R. Bentley; *Per. Way Eng.*, S. S. Platt; *Rolling Stock Supt.*, E. Sidgwick; *Chairman Try. Com.*, Ald. Taylor.

Rotherham Corporation Tramways, Rawmarsh Road, Rotherham. [T.A., Cross, Rotherham; T.N., 138, 152, and 241.] *General Manager & Elec. Eng.*, E. Cross; *Deputy Elec. Eng.*, J. R. Lilleker; *Traffic Superintendent*, H. Jagger; *Per. Way Eng.*, T. P. Collinge; *Rolling Stock Supt.*, C. A. Walker; *Chairman Try. Com.*, Ald. D. L. Winter; *Vice-Chairman*, Coun. T. Reeves.

St. Helens Corporation Tramways, Town Hall, St. Helens, Lancs. *Chairman Try. Com.*——; *Vice-Chairman*, Coun. W. N. Pilkington.

[Lines worked by the New St. Helens and District Tramways Co.]

Salford Corporation Tramways, 32, Blackfriars Street, Salford. [T.A., Tramways, Salford; T.N., 5367 and 5368 Central.] *Gen. Manager*, Geo. W. Holford; *Elec. Eng.*, J. A. Robertson; *Traffic Supt.*, J. W. Blakemore; *Per. Way Supt.*, E. B. Martin; *Rolling Stock Supt.*, R. Chadwick; *Chairman Try. Com.*, Ald. H. Linsley, J.P.; *Vice-Chairman*, Coun. W. H. Barrett.

Sheffield Corporation Tramways, 8, Division Street, Sheffield. [T.A., Tramways, Sheffield; T.N., 4600.] *General Manager*, A. R. Fearnley; *Traffic Supt.*, A. Handford; *Per. Way Eng.*, W. J. Hadfield; *Rolling Stock Supt.*, J. Smith; *Chairman Try. and Motors Com.*, Ald. Sir W. E. Clegg, J.P.; *Vice-Chairman*, Ald. W. C. Fenton.

Shipley Urban District Tramway, Dockfield, Shipley. [T.A., Electricity Works, Shipley; T.N., 190.] *Elec. Eng.*, Wm Redman; *Chairman Try. Com.*, H. Pitts.

[Lines leased to Bradford Corporation.]

Southampton Corporation Tramways, 161, Above Bar, Southampton. [T.A., Tramways, Southampton; T.N., 301.] *Gen. Manager*, W. T. Robson; *Boro. Elec. Engineer*, H. F. Street; *Traffic Manager*, C. G. Simpson; *Chairman Try. Com.*, Ald. F. A. Dunsford, J.P.

Southend-on-Sea Corporation Tramways, London Road, Southend-on-Sea. [T.N., 96.] *Gen. Manager and Elec. Eng.*, R. Birkett; *Traffic Manager*, J. T. Fayle; *Per. Way Eng.*, E. J. Elford (*Boro. Surveyor*); *Rolling Stock Supt.*, J. Dobson; *Chairman Try. Com.*, Coun. G. Radford.

Southend Pier Electric Railway, (owned and worked by Southend-on-Sea Corporation), [T.A., Piermaster, Southend; T.N., 91.] Southend-on-Sea. *Elec. Eng.*, C. R. Norton; *Piermaster*, Capt. N. E. Hucker; *Chairman*, Coun. H. Dowsett.

Southport Corporation Tramway, 44, Chapel Street, Southport. [T.N., 116.] *Gen. Manager*, T. J. Kendrew; *Boro' Elec. Eng.*, A. S. Black; *Chairman Try. Com.*, Ald. Griffiths, J.P.; *Vice-Chairman*, Coun. Clayton.

South Shields Corporation Tramways. Dean Road, South Shields. [T.A., Tramways, South Shields; T.N., 157.] *Gen. Manager & Elec. Eng.*, J. C. Whiteley; *Boro. Elec. Eng.*, H. S. Ellis; *Chairman Try. Com.*, Ald. W. G. Wylie.

Stalybridge Hyde, Mossley, and Dukinfield Tramways and Electricity Board, Waterloo Road, Stalybridge. [T.N., 311.] *Commercial Manager*, F. Schofield; *Chief Eng.*, R. Blackmore; *Chairman Try. Com.*, Ald. R. Wood; *Vice-Chairman*, Coun. S. C. Homer.

Stockport Corporation Tramways, Mersey Square, Stockport. [T.N., 232 and 237.] *Manager*, A. T. Eardley; *Elec. Eng.*, R. Lomax; *Chairman Try. Com.*, Ald. Chas. Sharples; *Vice-Chairman*, Ald. W. E. Hamnett.

Sunderland Corporation Tramways, Tramway Offices, Monkwearmouth, Sunderland. [T.A., Trys. Manager, Sunderland; T.N., 948.] *Gen. Manager and Elec. Eng.*, A. R. Dayson; *Chairman Try. Com.*, Coun. G. New, J.P.; *Vice-Chairman*, Coun. W. Walker, J.P.

Swindon Corporation Tramways, Electricity Works, Swindon. [T.A., Tramways, Swindon; T.N., 4.] *Manager*, T. Medcalf; *Elec. Eng.*, A. Dimmack; *Consulting Engs.*, Lacey, Sillar, & Leigh; *Chairman Try. Com.*, Coun. A. Bull; *Vice-Chairman*, Coun. Stevens.

Wallasey Corporation Tramways, Seaview Road, Wallasey. [T.A., Tramways, Liscard; T.N., 1431, Liscard.] *General Manager*, R. R. Greene; *Elec. Eng.*, J. H Crowther; *Per. Way Eng.*, W. H. Travers; *Chairman Try. Com.*, Coun. F. E. Howse; *Vice-Chairman*, Coun. H. W. Griffin.

Walsall Corporation Tramway, St. Paul's Buildings, The Bridge, Walsall. [T.A., Tramways, Walsall; T.N., 238 & 569.] *Gen. Manager*, R. L. Horsfield; *Elec. Eng.*, H. A. Howie; *Per. Way Eng.*, J. Taylor (*Boro. Surveyor*); *Chairman, Try. Com.*, Ald. J. Cope; *Vice-Chairman*, Ald. J. Williams.

Walthamstow Urban District Council Tramways, Chingford Road, Walthamstow, [T.A., Tramways, Walthamstow; T.N., 20.] *Tramways Manager*, W. Murray; *Elec. Eng.*, G. R. Spurr (Priory Avenue, Walthamstow); *Per. Way Eng.*, G. W. Holmes; *Chairman Trys. Com.*, Coun. Clarke.

Warrington Corporation Tramways, Mersey Street, Warrington. [T.N., 196] *Gen. Manager*, J. Telfer; *Elec. Eng.*, F. V. L. Mathias; *Chairman Try. Com.*, Coun. Dr. G. W. Joseph; *Vice-Chairman*, Coun. J. Wilkinson.

West Bromwich Corporation Tramway, Electricity Works, West Bromwich. [T.N., 100.] *Boro. Eng.*, A. D. Greatorex; *Boro. Elec. Eng.*, W. A. Jackson; *Chairman Try. Com.*, Ald. A. G. Turley, J.P.; *Vice-Chairman*, Coun. G. Garrett.

[These tramways are leased to the South Staffs. (Lessee) Co., Ltd.]

West Ham Corporation Tramways, Greengate Street, Plaistow, London, E. [T.A., Trameurs, Plais., London; T.N., 868 East.] *General Manager*, L. Slattery; *Boro' Elec. Eng.*, J. W. Beauchamp; *Chairman Try. Com.*, Coun. Kensett.

West Hartlepool Corporation Tramways, Cleveland Road, West Hartlepool. [T.N., 6073.] *Gen. Manager & Eng.*, Chas. Burgess; *Chairman Try. Com.*, Ald. Martin; *Vice-Chairman*, Coun. Charlton.

Wigan Corporation Tramways, Market Place, Wigan; [T.N., 226.] *Gen. Manager*, F. Buckley; *Per. Way Eng.*, A. T. Gooseman; *Chairman Try. Com.*, Ald. R. T. Fletcher; *Vice-Chairman*, Coun. J. Walkden.

Wolverhampton Corporation Tramways, Municipal Tramway Offices, Cleveland Road, Wolverhampton. [T.N., 824.] *Gen. Manager and Engineer*, C. O. Silvers; *Boro. Elec. Eng.*, S. T. Allen; *Per. Way Eng.*, George Green; *Chairman Try. Com.*, Ald. Sir C. T. Mander, Bart., J.P.; *Vice-Chairman*, Ald. S. Craddock, J.P.

York Corporation Tramways, 8, Clifford Street, York. [T.N., 302]. *Gen. Manager and Elec. Eng.*, J. W. Hame; *Traffic Supt.*, J. W. Horton; *Per. Way Eng.*, F. W. Spurr (City Surveyor); *Chairman Try. Com.*, Ald. S. W. Meyer; *Vice-Chairman*, Coun. W. H. Sessions.

COMPANY TRAMWAYS.

Aberdeen Suburban Tramways Company, 15, Golden Square, Aberdeen. [T.A., Judicial, Aberdeen; T.N., 447.] *Manager & Per. Way Eng.*, A. Wilkie; *Sec.*, G. Duncan; *Chairman*, James Mearns; *Directors*, W. Jackson, Dr. Christie, Jas. Sellar.

Airdrie and Coatbridge Tramways Company, Tramway Depôt, Main Street, Coatbridge [T.N., 105], and Electrical Federation Offices, Kingsway, London, W.C. *Gen. Manager*, A. Robertson; *Sec.*, P. N. Gray; *Chairman*, W. L. Madgen; *Directors*, H. S. Day, A. C. Miles, G. J. Somerville.

Barnsley and District Electric Traction Company, Ltd., Car Depot, Sheffield Road, Barnsley. [T.A., Tramways, Barnsley; T.N., 159.] *Acting Manager*, W. E. Nicoll; *Acting Sec.*, P. N. Gray; *Chairman*, E. Garcke; *Directors*, Col. Sir Thomas Pilkington, Bart., E. A. Paris.

Barrow-in-Furness Tramways, Salthouse Road Depot, Barrow, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Barrow; T.N., 125.] *Manager*, J. Dobson; *Sec.*, F. J. Cursons; *Acting Sec.*, J. S. Bowker; *Chairman*, H. S. Day; *Directors*, J. V. Kitchener, E. R. Soames.

Bath Electric Tramways Company, Ltd., Walcot Street, Bath, and 119-125, Finsbury Pavement, London, E.C. [T.A., Trams, Bath; T.N., 1214.] *Gen. Manager and Eng.*, W. E. Hardy; *Traffic Supt.*, E. Seckington; *Sec.*, H. J. Almond; *Chairman*, Hon. Sir J. Sivewright, K.C.M.G.; *Directors*, H. F. Clutterbuck, E. H. R. Trenow, A. A. C. Swinton, E. Callaird.

Bessbrook and Newry Tramway Company, Bessbrook, Co. Armagh. [T.A., Tramways, Bessbrook.] *Manager*, Robert Caven; *Elec. Eng.*, J. L. D. Meares; *Chairman*, J. N. Richardson; *Directors*, C. H. Richardson, R. T. Scott, T. W. Richardson, T. McGreggor Greer.

Birmingham District Power and Traction Company, Power Station, Downing Street, Smethwick, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Power Station, Smethwick; T.N., 65 Smethwick.] *Gen. Manager*, W. G. Bond; *Secretary*, B. Kingsford; *Chairman*, C. Shirreff Hilton; *Directors*, J. A. Lycett, W. L. Madgen, S. R. Blundstone, R. J. Howley.

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ELECTRIC TRAMWAYS IN THE UNITED KINGDOM.

Blackpool and Fleetwood Tramroad Company, Ltd., Bispham, near Blackpool. [T.A., Cameron, Blackpool; T.N., 121.] *General Manager and Secretary*, J. Cameron; *Elec. Eng.*, A. Cameron; *Chairman*, John Greenwood; *Directors*, R. H. Prestwich, R. B. Barningham, R. S. Boddington, G. Richardson, G. Readman.

Blackpool and Fylde Light Railway Company, 5, Clifton Street, Blackpool. (No appointment of engineer or officials yet made.) *Secretary*, R. Bibby; *Chairman*, John Greenwood; *Directors*, T. Fisher, J.P., John Platt, J.P., W. Hardman, J.P., R. H. Mabbott.

Blackpool, St. Anne's, and Lytham Tramways Company, Ltd., Squires Gate, and 30, Birley Street, Blackpool. [T.N., 327 and 22]. *Gen. Manager and Elec. Eng.*, H. W. Laing; *Traffic Manager*, G. W. Wood; *Rolling Stock Supt.*, J. Partington; *Secretary*, Chas. E. Riding; *Chairman*, G. Nicholson; *Directors*, T. M. Smith, T. Preston.

Bray and Enniskerry Railway Company, 52, Westland Row, Dublin. *Sec.*, M. F. Keogh; *Chairman*, A. Killingley; *Director*, F. M'Crea.

Brighton Beach Electric Railway, Madeira Road, Brighton. [T.A., Volk, Brighton; T.N., 14 P.O.] *Manager and Eng.*, Magnus Volk; *Traffic Superintendent*, H. Sheppard; *Per. Way Eng.*, J. Barker; *Secretary*, A. Volk; *Chairman*, Magnus Volk; *Directors*, M. H. Volk, B. W. Symonds, A. Volk.

Bristol Tramways and Carriage Company, Ltd., Clare Street House, Bristol. [T.A., Cab, Bristol; T.N., 74 & 3074 Nat.] *Manager*, Chas. Challenger; *Assist. Manager*, S. E. Smith; *Electrical Engineer*, ——— ; *Permanent Way Engineer*, G. T. C. Edwards; *Secretary*, H. F. Cooper; *Chairman*, S. White, J.P.; *Directors*, W. G. Verdon Smith (*Managing*), J. H. Howell, J.P., G. Stanley White, S. E. Baker.

British Electric Traction Company, Ltd., Electrical Federation Offices, Kingsway, London, W.C. E. Garcke (*chairman*); *Directors*, C. Shirreff B. Hilton, W. L. Madgen, Sir Charles Ollivant, A. Shepherd, G. T. Symons, C. G. Tegetmeier, P. D. Tuckett; *Joint Managers*, C. H. Dade and R. J. Howley; *Acting Secretary*, T. Bower; *Accountant*, C. Walmsley.

This company is interested in the following tramways, particulars of which are given under their respective names:

Airdrie & Coatbridge.
Barnsley & District.
Barrow-in-Furness.
Birmingham & District Power & Traction Co.:
Birmingham & Midland
Dudley, Stourbridge, & District.
South Staffordshire.
Wolverhampton Dist.
Devonport & District.
Gateshead & District.
General Elec. Tramways.
Gravesend & Northfleet.
Greenock & Port Glasgow.
Jarrow & District.
Kidderminster & District.
Merthyr.
Middleton.
Oldham, Ashton, & Hyde.
Peterborough.
Potteries.
Rothesay.
Sheerness & District.
South Metropolitan.
Southport.
Swansea.
Taunton.
Tynemouth & District.
Weston-super-Mare & District.
Worcester.
Wrexham & District.
Yorkshire (Woollen Dist.)

Burton and Ashby Light Railways, Power Station, Swadlincote, nr. Burton-on-Trent. [T.A., Toulmin, Swadlincote; T.N., 1.] *Manager and Eng.*, Jas. Toulmin; *Secretary*, A. L. Charles; *Chairman*, G. Murray Smith.

[The line is owned and worked by the Midland Railway Company.]

Camborne and Redruth Tramways, Elec. Works, Carn Brea, R.S.O., Cornwall. [T.N., 3, Camborne.] (Owned by Urban Elec. Supply Co.) *Manager and Eng.*, L. A. Hards; *Sec.*, C. H. Jones; *Chairman*, P. D. Tuckett; *Directors*, E. Charrington, H. B. Grotian, Douglas Owen.

Carlisle Tramways Company, Ltd., City of, Depot and Offices, London Road, Carlisle. [T.A., Tramways, Carlisle; T.N., 0180.] *Engineer and Manager*, R. L. McCulloch.

Chatham and District Light Railways Company, Luton Road, Chatham, and 88, Cannon Street, London, E.C. [T.A., Tramways, Chatham; T.N., 51.] *General Manager*, W. Jensen; *Assist. Manager*, A. J. Bousfield; *Traffic Manager*, ——— ; *Secretary*, A. Clements; *Chairman*, A. R. Monks; *Directors*, H. C. Levis, J. F. Nauheim, W. B. H. Martindale.

Cheltenham and District Light Railway Company, Cheltenham. [T.N., 341.] *Directors*, A. H. Beatty (*Chairman*), W. Shearer, H. L. Williams, A. S. Guinness, H. J. McCormick; *Sec.*, Wm. C. Bryden, C. A., 66, Queen Street, London, E.C.; *Local Eng. and Manager*, Henry J. McCormick, St. George's Road, Cheltenham.

Clontarf and Hill of Howth Tramroad Company, 39, Dame Street, Dublin. [T.A., c/o Railways, Dublin; T.N., 917.] *Secretary*, J. P. Chapman; *Chairman*, W. L. Murphy; *Directors*, E. Anderson, J. J. Dudley.

Cork Electric Tramways and Lighting Company, Ltd., Albert Street, Cork. [T.A., Tramways, Cork; T.N., 78 and 535.] *Manager and Engineer*, H. H. Nalder; *Traffic Manager*, H. G. Whiting; *Per. Way Engineer*, H. Mack; *Secretary*, A. Clements; *Chairman*, A. R. Monks; *Directors*, E. Anderson, W. M. Murphy, Capt. W. Martindale, H. C. Levis.

Dartford Urban District Council Light Railways. Car Depot, Priory Road, Dartford. [T.N., 31 Dartford.] (Leased to and worked by Balfour, Beatty, & Co., Ltd., 66, Queen Street, London, E.C.) *Acting Manager*, F. A. Kincaid Fergusson.

Devonport and District Tramways Company, Electrical Federation Offices, London, W.C. [T.A., Head Office, Devonport c/o Tramway, London; T.N., Head Office, Holborn 2686. *Manager and Eng.*, George Cardwell; *Secretary*, S. M. Wright; *Acting Sec.*, P. N. Gray; *Chairman*, C. S. B. Hilton; *Directors*, J. S. Raworth, E. R. Soames, C. G. Tegetmeier, R. J. Sutcliffe.

[The Company's undertaking has been sold to Plymouth Corporation.]

Dewsbury, Batley, and Birstall Tramways Company, Ltd., Electrical Federation Offices, Kingsway, London, W.C.

[Lines worked by Yorkshire (Woollen District) Electric Tramways, Ltd., *q.v.*]

Dewsbury and Ossett Corporation and Soothill Nether Urban District Council Tramways, (Lessees: The National Elec. Construction Co., Ltd., 3, Laurence Pountney Hill, London, E.C.) [T.A., Overhauled, London; T.N., 5329 and 5330 Bank.] *Manager*, W. MacGibbon.

Douglas—Ramsey. (The Manx Elec. Rly. Company), 1, Strathallan Crescent, Douglas. (See Manx Electric Railway Company).

Douglas Southern Electric Tramways, Ltd., Marine Drive, Douglas, Isle of Man, and 24, Brazennose Street, Manchester. [T.A., Traffic, Douglas.] *Manager and Eng.*, R. Orton; *Sec.*, J. E. Sharples; *Chairman*, T. J. Hutchinson; *Directors*, I. E. Winslow, E. A. Hopkins.

Dublin and Lucan Electric Railway Company, 15, Conyngham Road, Dublin. [T.A., Lucan Tramway, Dublin; T.N. 2282 and 4006 Dublin, and 5 Lucan.] *Manager, Elec. Eng., and Sec.*, D. McDowall Grosart, J.P.; *Chairman*, J. W. Hill, J.P.; *Directors*, E. Anderson, A. B. Coyle, J.P., G. N. Murphy.

Dublin United Tramways Company (1896), Ltd., 9, Upper Sackville Street, Dublin. [T.A., Tramways, Dublin; T.N., 58 and 59.] *Gen. Manager*, G. Marshall Harriss; *Elec. Eng.*, R. Tanham; *Con. Eng.*, H. F. Parshall; *Per. Way Eng.*, P. F. O'Sullivan; *Secretary*, W. McHugh; *Chairman*, W. M. Murphy, J.P.; *Directors*, Joseph Mooney, J.P., Rt. Hon. L. A. Waldron, P.C., William Hewat.

Dudley, Stourbridge and District Electric Traction Company, Ltd. (Section of The Birmingham and Midland Tramways Joint Committee), Power Station, Downing Street, Smethwick, Brierley Hill, Staffs., and Electrical Federation Offices, Kingsway, London, W.C. [T.N., 65 Smethwick.] *General Manager*, W. G. Bond; *Secretary*, E. H. Woodhall; *Chairman*, S. R. Blundstone; *Directors*, J. A. Lycett, R. J. Howley.

Dunfbarton Burgh and County Tramways Company, Tramway Depot, Dumbarton, and 28, Rutland Street, Edinburgh. [T.A., Tramways, Dumbarton; T.N., 119.] *Gen. Manager and Elec. Eng.*, J. P. McMahon; *Secretary*, A. Dishart; *Chairman*, G. Balfour; *Directors*, K. Sanderson, K. A. Scott Moncrieff.

Dundee, Broughty Ferry & District Tramways Company, Milton, Monifieth, N.B. [T.N., 24 Monifieth.] *Gen. Manager & Engineer*, Daniel Fisher; *Secretary*, E. Cowan; *Chairman*, George Balfour; *Directors*, Edward Cowan, David Hynd.

Dunfermline and District Tramways Company, Tramway Depot, Cowdenbeath, Fife, and 8, New Row, Dunfermline. *Manager and Engineer*, J. H. Shepherd; *Secretary*, G. A. Nicolson; *Cons. Engs.*, Hawtayne & Zeden; *Directors*, Wm. Low, G. Balfour (*managing*), K. Sanderson, D. Hynd.

Falkirk & District Tramways Company, Larbert Road, Larbert, Stirlingshire. [T.A., Tramways Co., Falkirk; T.N., 154 Falkirk.] *Gen. Manager and Engineer*, D. Hays; *Chairman*, G. M. Brown; *Directors*, A. W. Tait, R. Hunter, G. Balfour, C. D. Geddes.

Felixstowe Pier Railway, Felixstowe. (The Coast Development Corporation, Ltd.) *Elec. Eng.*, E. A. Lambert.

Gateshead and District Tramways Company, Tramway Depôt, Sunderland Road, Gateshead, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramway Depôt, Gateshead; T.N., 125 & 408 Gateshead.] *General Manager*, William Morrison; *Secretary*, H. W. Davis; *Chairman*, H. S. Day; *Directors*, H. A. Stagg, C. R. Greene, Judge L. A. Atherley-Jones, K.C.

Giant's Causeway and Portrush Electric Tramway Company, Portrush. *Manager & Sec.*, W. McCurdy; *Elec. Eng.*, W. A. Traill; *Chairman*, F. J. S. Moore; *Directors*, C. M'D. Stuart, W. A. Traill.

Glossop Tramways, Electricity Works, Glossop (owned by the Urban Electric Supply Co.) [T.N., 34, Glossop.] *Manager and Res. Eng.*, C. E. Knowles; *Rolling Stock Supt.*, A. W. Bullough; *Secretary*, C. H. Jones; *Chairman*, P. D. Tuckett; *Directors*, E. Charrington, F. E. Gripper, H. B. Grotrian, D. Owen.

Gosport and Fareham Tramways, Tramways and Lighting Office, Gosport, Hants., and Moorgate Station Chambers, London, E.C. [T.A., Tramways, Gosport; T.N., 3, Post Office, Gosport.] *Eng. and Manager*, J. Fereday Glenn; *Sec.*, J. Barber Glenn; *Chairman*, A. Beattie, J.P., D.L.; *Directors*, J. Barber Glenn (*managing*), S. Hern.

Gravesend & Northfleet Electric Tramways, Ltd., Tramway Depot, Northfleet, Kent, and Electrical Federation Offices, Kingsway, London, W.C [T.N., 958, Gravesend.] *Manager*, J. R. Groves; *Sec.*, H. C. Walter; *Chairman*, W. L. Madgen; *Directors*, P. N. Gray, W. S. Wreathall.

Great Crosby Tramways, 31, James Street, Liverpool.

[This tramway is worked by the Liverpool Overhead Railway Company.]

Great Grimsby Street Tramway Co., Southampton House, Cleethorpes, and Moorgate Station Chambers, London, E.C. [T.A., Blanco, Cleethorpes; T.N., 16.] *Manager and Eng.*, H. L. White; *Elec. Eng.*, H. O. White; *Managing Director and Secretary*, J. B. Glenn; *Chairman*, A. Beattie, J.P., D.L.; *Director*, S. Hern.

Greenock and Port Glasgow Tramways Company, Ladyburn, Greenock, and Electrical Federation Offices, Kingsway, London, W.C. [T.A. Tramways, Greenock; T.N., 562]. *Manager*, A. Robertson; *Secretary*, P. N. Gray; *Chairman*, W. L. Madgen *Directors*, G. J. Somerville, A. C. Miles, H. S. Day.

Guernsey Railway Company, Ltd., Hougue-à-la-Perre, Guernsey. *Manager and Elec. Eng.*, Arthur G. Bird; *Sec.*, J. de Mouilpied; *Chairman*, G. F. Peek; *Directors*, W. D. Murdoch, E. Valied, J. B. Collings, Q. Le Pelley.

Hampshire Light Railway (Electric) Company, Ltd., Moorgate Station Chambers, London, E.C. *Secretary*, J. B. Glenn; *Chairman*, A. Beattie, J.P.; *Directors*, J. Barber Glenn (*managing*), S. Hern.

[This company works the Portsdown and Horndean Light Railway.]

Hastings Tramways Company, Ltd., Beaufort Road, Silverhill, St. Leonards-on-Sea, and 1, Queen Victoria Street, London, E.C. [T.A., Tramways, Hastings, and Enshrine, London; T.N., 90 Hastings, and 3465, City]. *General Manager and Elec. Eng.*, W. Vincent Edwards; *Secretary*, W. R. Elston; *Chairman*, G. Kitchen; *Directors*, E. C. Morgan, J. C. Williamson, Dr. Moody.

Imperial Tramways Company, Ltd., Clare Street House, Bristol. *Secretary*, F. H. Withers; *Manager*, F. Freshwater; *Chairman*, S. White, J.P.; *Directors*, W. G. Verdon Smith (*Managing*), H. C. Godfray, J. H. Howell, Sir G. Stanley White, Bart.

Isle of Thanet Electric Tramways and Lighting Company, Ltd., St. Peter's, Kent, and Moorgate Station Chambers, London, E.C. [T.A., Tramways, St. Peters, Kent; T.N., 29 Broadstairs]. *Gen. Manager and Elec. Eng.*, J. A. Forde; *Traffic Supt.*, ——— ; *Secretary*, J. Barber Glenn; *Chairman*, A. R. Monks; *Directors*, Lord Arthur Butler, W. M. Murphy, H. Brown.

Jarrow and District Electric Traction Company, Ltd., Electrical Federation Offices, Kingsway, London, W.C. [T.A., Jarrow, c/o Tramway, London; T.N., 2686 Holborn.] *Traffic Manager*, G. McClelland; *Secretary*, C. W. Francis; *Acting Sec.*, H. A. Stagg; *Chairman*, G. J. Somerville; *Directors*, W. Morrison (*managing*), H. S. Day.

Kidderminster & District Electric Lighting and Traction Co., Ltd., Kidderminster and Electrical Federation Offices, Kingsway, London, W.C. [T.N., 108]. *General Manager*, W. G. Bond, *Secretary*, B. Kingsford; *Chairman*, E. Garcke; *Directors*, J. A. Lycett, H. S. Day, W. L. Madgen.

Kinver Tramway, Kinver, and Electrical Federation Offices, Kingsway, London, W.C., *q.v.*, Dudley, Stourbridge, and District Elec. Traction Co., Ltd.

Lanarkshire Tramways Company, Edinburgh Road, Motherwell, N.B., and 88, Cannon Street, London, E.C. [T.A., Tramways, Motherwell; T.N., 64.] *Gen. Manager and Eng.*, G. F. Moller; *Elec. Eng.*, E. H. Glennie; *Per. Way Eng.*, R. Foster; *Traffic Supt.*, J. L. White; *Sec.*, A. Clements; *Chairman*, A. R. Monks; *Directors*, Sir B. Cunard, H. C. Levis, W. H. Whaite, G. Franklin, J. F. Nauheim.

Lancashire United Tramways Limited, Atherton, Lancs. [T.A., Tramways, Atherton; T.N., 36, Atherton.] *Gen. Manager and Engineer*, E. H. Edwardes; *Secretary*, H. P. Conibear; *Chairman*, Hon. A. Stanley, M.P.; *Directors*, J. M. Henderson, M.P., R. Watson, J.P., A. Adam, J. S. Austen.

Liverpool and Prescot Light Railway.—This line, which with the St. Helens Tramways forms the connecting link between the City of Liverpool and South Lancashire Tramways, is owned and worked by the Lancashire United Tramways, Ltd.

Liverpool Overhead Railway Company, 31, James Street, Liverpool. [T.A., Motor, Liverpool; T.N., 5463 Central.] *Gen. Manager and Eng.*, E. J. Neachell; *Secretary*, W. H. Alexander; *Chairman*, H. C. Woodward; *Directors*, J. E. Anderson, G. D. Killey, J. U. Hodgson, M. H. Maxwell.

Llandudno and Colwyn Bay Electric Railway, Limited, Tramway Depôt, Rhôs-on-Sea, Colwyn Bay, and Basildon House, Moorgate Street, London, E.C. *Gen. Manager*, Alex. G. Balfour; *Secretary*, A. W. R. Lovering; *Directors*, G. Balfour, A. W. Tait, T. Stoker.

Llanelly and District Electric Lighting and Traction Company, Ltd., Llanelly, and 66, Queen Street, London, E.C. *Engineer and Manager*, J. E. Stewart; *Secretary*, G. D. Prince; *Chairman*, A. R. Holland; *Directors*, A. V. Anderson, M. A. Edwards, A. H. Beatty.

London United Tramways Ltd., Electric Railway House, Broadway, Westminster, London, S.W. [T.N., 6800, Victoria.] *Managing Director*, J. Devonshire; *Secretary*, A. L. Barber; *Gen. Manager and Eng.*, A. H. Pott; *Chairman*, W. M. Acworth; *Directors*, Rt. Hon. Viscount Knutsford, F. V. Schuster, W. C. Burton, H. A. Vernet.

Luton Corporation Tramways (leased to and worked by Balfour, Beatty & Co., Ltd., 22a, College Hill, London, E.C.), Tramway Offices, Park Street, Luton. [T.N., 230.] *Engineer and Manager*, A. E. Wray.

Mansfield & District Light Railway Co., Sutton Road, Mansfield. [T.A., Cars, Mansfield, T.N., 107.] *Gen. Manager and Sec.*, Stanley Dudman, *Chairman*, A. R. Holland; *Directors*, W. J. Chadburn, A. H. Beatty, G. Balfour.

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ELECTRIC TRAMWAYS IN THE UNITED KINGDOM.

Manx Electric Railway Company, Ltd., 1, Strathallan Crescent, Douglas, Isle of Man, and 3, Finch Lane, London, E.C. [T.A., Electric, Douglas, Man.; T.N., 61.] *Gen. Manager & Eng.*, F. Edmondson; *Secretary*, C. A. Huni; *Chairman*, Col. Sir A. Griffith Boscawen; *Directors*, Sir W. H. Vaudrey, B. E. Greenwell, E. Remnant.

Merthyr Electric Traction and Lighting Company, Ltd., 53, Pontmorlais Circus, Merthyr, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramway Company, Merthyr; T.N., 0180, Merthyr Tydfil.] *Managing Eng.*, L. W. Dixon; *Secretary*, S. J. Clements; *Chairman*, G. J. Somerville; *Directors*, C. G. Tegetmeier, W. L. Madgen, E. R. Soames.

Metropolitan Electric Tramways, Limited, Electric Railway House, Broadway, Westminster, London, S.W. [T.A., Metrolito, London; T.N., 6800, Victoria.] Manor House Offices, Seven Sisters Road, N. [T.A., Lentiscus, London; T.N., 77 Tottenham.] *Gen. Manager and Eng.*, A. H. Pott; *Traffic Manager*, W. E. Hammond; *Secretary*, A. L. Barber; *Chairman*, E. Garcke; *Directors*, Sir E. Spencer, W. L. Madgen, C. G. Tegetmeier, J. Devonshire (*Managing Director*).

Mexborough and Swinton Tramways Company, Electricity Works, Rawmarsh, Yorks. [T.N., 266], and 3, Laurence Pountney Hill, Cannon Street, London, E.C. *Manager and Eng.*, G. H. Browne; *Cons. Elec. Eng.*, F. E. Stanley; *Commercial Manager*, Wm. T. Mitchell; *Traffic Supt.*, M. McLeod; *Secretary*, L. D. H. Jacobs; *Chairman*, L. B. Schlesinger; *Director* (*Managing*), W. B. Cownie, C.A.

Middlesbro, Stockton, and Thornaby Electric Tramway, Bridge Road, Stockton-on-Tees, and Clare Street House, Bristol. [T.A., Tramways, Stockton; T.N., 129.] *Manager*, F. Freshwater; *Secretary*, F. H. Withers; *Chairman*, Samuel White, J.P.; *Directors*, H. C. Godfray, James H. Howell, J.P., W. G. Verdon Smith (*Managing Director*)

Middleton Electric Traction Company, Ltd., Hiltonfold Lane, Middleton, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramway Depot, Middleton; T.N., 37 Middleton.] *Gen. Manager*, W. F. Endean; *Secretary*, G. R. Oliphant; *Acting Secretary*, J. S. Bowker; *Chairman*, Lord Vaux of Harrowden; *Directors*, J. V. Kitchener, W. S. Wreathall.

Morecambe Tramways Company, Heysham Road, Morecambe, and 62, Market Street, Lancaster. [T.N. 1, Morecambe, and 71, Lancaster.] *Secretary and Manager*, G. H. Petty; *Chairman*, W. H. Pickles; *Directors*, J. Stott, S. Wright, O. Carr.

Musselburgh and District Electric Light and Traction Co., Ltd., High St., Musselburgh, N.B. [T.A., Tramways, Musselburgh; T.N., 115.] (Registered Office, 3, Laurence Pountney Hill, London, E.C. [T.N., 5329 and 5330, Bank.]) *Manager*, E. J. Walsh; *Resident Engineer*, E. J. Walsh; *Traffic Inspector*, W. Mittell; *Secretary*, L. D. H. Jacobs; *Chairman*, L. B. Schlesinger; *Directors*, B. Burnham, J. Anderson, W. B. Cownie, R. Watson.

New General Traction Company, Ltd., 8, Crosby Square, London, E.C. *Managing Director*, E. A. Hopkins; *Secretary*, J. G. Mills; *Chief Engineer*, I. E. Winslow; *Chairman*, Baron E. B. d'Erlanger. [This company controls the Norwich and the Douglas Southern Electric Tramways Companies.]

New St. Helens and District Tramways Company, Ltd., Atherton, Lancs. [T.A., Tramways, Atherton; T.N., 36 Atherton.] *Engineer and Manager*, C. D. Stanley; *Secretary*, H. P. Conibear; *Chairman*, Hon. Arthur Stanley, M.P.; *Directors*, J. Hunter, J.P., H. Martin, J.P., J. M. Henderson, M.P., J. S. Austen, and E. H. Edwardes (*Managing*).

North Shields Tramway Company owned and worked by Tynemouth and District Elec. Trac. Co. *q.v.*

Norwich Electric Tramway Company, 5, Orford Hill, Norwich, and 8, Crosby Square, London, E.C. [T.A., Tramways, Norwich; T.N., 475.] *Manager and Engineer*, F. W. Ketley; *Consulting Eng.*, I. E. Winslow; *Sec.*, J. G. Mills; *Directors*, E. A. Hopkins, Hon. A. G. Brand, F. FitzGerald, G. M. Chamberlin, and C. Pakeman.

Nottinghamshire and Derbyshire Tramways Company, Tramway Depot, Langley Mill, Derbyshire, and 66, Queen Street, London, E.C. [T.A., Tramways, Langley Mill; T.N., 53, Langley Mill.] *Manager*, C. R. Walker; *Secretary*, Wm. C. Bryden; *Directors*, A. R. Holland, A. H. Beatty, A. V. Anderson, and M. A. Edwards.

Oldham, Ashton and Hyde Electric Tramway, Ltd., Tramway Depot, Denton, Lancs., and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Denton; T.N., 265 Ashton.] *Supt.*, A. Anderson; *Secretary*, F. J. Cursons; *Acting Secretary*, J. S. Bowker; *Chairman*, E. Garcke; *Directors*, Judge L. A. Atherley Jones, K.C., W. S. Wreathall, J. V. Kitchener (*Managing Director.*)

Paisley District Tramways Company, Tramway Depôt, Paisley, and 83, Cannon Street, London, E.C. [T.N., 218 Paisley.] *Gen. Manager and Elec. Eng.*, Fred Coutts; *Traffic Supt.*, E. Jeffs; *Secretary*, A. Clements; *Con. Eng.*, H. F. Parshall; *Chairman*, O. H. Smith; *Directors*, Lord Arthur Butler, D. Johnston Smith, John Young.

Peterborough Electric Traction Company, Ltd., Lincoln Road, Peterborough, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Peterborough; T.N., 224.] *Gen. Manager*, T. G. Clabburn; *Secretary*, S. M. Wright; *Actiug Sec.*, P. N. Gray; *Chairman*, Lord Vaux of Harrowden; *Directors*, E. A. Paris, R. J. Howley.

Plymouth, Stonehouse and Devonport Tramways Co., 16, Edgcumbe Street, Stonehouse, Devon, and Moorgate Station Chambers, London, E.C. [T.N. 53.] *Manager*, G. H. Moreton; *Elec. Eng.*, J. Graham Pearce; *Sec.*, J. Barber Glenn; *Chairman*, Andrew Beattie, J.P., D.L.; *Directors*, S. Hern, J. B. Glenn (*Managing*).

Portsdown and Horndean Light Railway, Cosham, Hants.; Tramways and Lighting Office, Gosport, Hants., and Moorgate Station Chambers, London, E.C. [T.A., Tramways, Gosport; T.N., 3, Post Office, Gosport.] *Engineer and Manager*, J. Fereday Glenn; *Secretary*, J. Barber Glenn; *Chairman*, A. Beattie, J.P., D.L.; *Directors*, J. Barber Glenn (*Managing*), S. Hern.

Potteries Electric Traction Company, Tramway Depôt, Stoke-on-Trent, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Stoke-on-Trent; T.N., 141.] *Gen. Manager and Eng.*, W. Thom; *Power and Rolling Stock Supt.*, F. J. Chapple; *Traffic Manager*, F. Hatch; *Secretary*, B. Kingsford; *Chairman*, R. J. Howley; *Directors*, F. W. Chanter, S. Mear, J. V. Kitchener.

Rhondda Tramways Company, Ltd., Tramway Depot, Porth, Rhondda, and Laurence Pountney Hill, Cannon Street, London, E.C. [T.A., Tramways, Porth; T.N., 118.] *Manager and Engineer*, H. Holliday; *Secretary*, L. D. H. Jacobs; *Chairman*, L. B. Schlesinger; *Directors*, J. C. Saunders, W. B. Cownie, J. T. Jervis, H. T. Barnett.

Rothesay Tramways Company, Ltd., Point House, Rothesay, and Electrical Federation Offices, Kingsway, London, W.C. *Manager*, A. Robertson; *Sec.*, P. N. Gray; *Chairman*, A. C. Miles; *Directors*, W. L. Madgen, H. S. Day.

Ryde Pier Company, Ryde, Isle of Wight. *Manager*, W. D. Stanney; *Elec. Eng.*, C. Harrison; *Chairman*, G. E. Mears.

Scarborough Tramways Company, Scalby Road, Scarborough. [T.A., Electric Tramways, Scarborough; T.N., 294.] *Gen. Manager and Elec. Eng.*, J. V. Moinet; *Chairman*, F. E. Gripper; *Directors*, V. Fowler, M. T. Whittaker, J. C. Wigham.

Sheerness and District Electric Power and Traction Company, Ltd., Electricity Works, Sheerness East, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Sheerness; T.N., 45.] *Manager & Eng.*, A. Charlton; *Sec.*, H. A. Stagg; *Chairman*, G. J. Somerville; *Directors*, R. J. Howley, E. R. Soames.

Snaefell Mountain Railway (See Manx Electric Railway Company).

South Metropolitan Electric Tramways and Lighting Company, Ltd., 114, Church Street, Croydon, 30, High Street, Sutton, and Electric Railway House, Broadway, Westminster, London, S.W. [T.N., 304 Croydon, 14 Sutton and 6800, Victoria.] *Gen. Manager and Engineer*, A. V. Mason; *Secretary*, W. M. Wright; *Chairman*, C. G. Tegetmeier; *Directors*, J. Devonshire (*managing*), E. Garcke, A. L. Barber.

Southport Pier Co., Ltd., Southport. [T.A., Pier, Southport; T.N., 174.] *Manager*, A. T. Faiers; *Chairman*, A. Skinner; *Directors*, J. R. Haworth, S. J. Fane, G. Duckworth, J. Duckworth.

Southport Tramways Company, Ltd., The Depôt, Churchtown, Southport, and Electrical Federation Offices, Kingsway, London, W.C. *Manager*, J. Lloyd; *Secretary*, H. A. Stagg; *Chairman*, C. S. Hilton; *Directors*, J. S. Raworth, Lord Vaux of Harrowden, J. V. Kitchener, G. R. Hulme.

South Staffordshire Tramways (Lessee) Company, Ltd., Electrical Federation Offices, Kingsway, London, W.C. [T.N., 65 Smethwick.] *General Manager*, W. G. Bond; *Secretary*, E. H. Woodhall; *Chairman*, W. S. Schuster; *Directors*, J. A. Lycett, S. R. Blundstone, R. J. Howley, B. Kingsford.

Sunderland District Electric Tramways. Ltd., Fence Houses, co. Durham. [T.A., Trams, Philadelphia, Shiney Row; T.N., 21, Houghton-le-Spring.] *Resident Manager and Engineer*, G. Stratton; *Traffic Manager*, E. A. Pearman; *Secretary*, H. J. Almond; *Directors*, H. R. Hogg, Hon. R. Parker, R. Tayler, A. Counter, C. Eves.

Sutton and Howth Electric Tramway Company (owned by the Great Northern Railway, Ireland), Sutton, county Dublin, and Amiens Street Station, Dublin. [T.A., Railroad, Dublin; T.N., 171, Dublin, and 16 Sutton.] *Gen. Manager*, John Bagwell; *Elec. Eng.*, A. W. Whieldon; *Chief Eng.* F. A. Campion; *Locomotive Eng.*, G. T. Glover; *Sec.*, T. Morrison; *Chairman*, F. Vernon; *Directors*, W. P. Cairnes (*Deputy Chairman*), W. B. Carson, H. S. Guinness, J. T. Reade, Capt. W. L. A. Goulding, Lt.-Col. J. C. W. Madden, R. A. Gradwell, J. Milne Barbour, T. F. Cooke, W. H. B. Moorhead, Lt.-Col. H. Plews, G. S. Clark.

Swansea Improvements and Tramways Company, 2, Rutland St., Swansea, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramway, Swansea; T.N., 268 Swansea.] *Gen. Manager*, D. James; *Elec. Eng.*, A. Johnston; *Secretary*, S. J. Clements; *Chairman*, C. G. Tegetmeier; *Directors*, G. J. Somerville, S. E. Garcke, E. R. Soames.

Taunton Electric Traction Company, Ltd., East Reach, Taunton, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Taunton, c/o "Tramways," London.] *Manager*, B. H. Griffith; *Acting Manager*, L. Marshall; *Secretary*, S. M. Wright; *Acting Sec.*, P. N. Gray; *Chairman*, G. J. Somerville; *Directors*, E. Garcke.

Torquay Tramways Co., Ltd., St. Marychurch Road, Torquay. [T.A., Carsheds, Torquay; T.N., 167 Torquay.] *Registered Office*, 3, Laurence Pountney Hill, Cannon Street, E.C. *Manager and Eng.*, H. J. Nisbett; *Secretary*, L. D. H. Jacobs; *Managing Director*, W. B. Cownie.

Trafford Park Company (Tramways), Trafford Park, Manchester. [T.A., Developing, Manchester; T.N., 61, Trafford Park.] *Secretary*, C. A. Grundy; *Chairman*, Marshall Stevens; *Directors*, Sir J. Lyons, H. McNiel, J. H. Balfour Browne, K.C.

[Lines worked by the Manchester and Salford Corporations.]

Tynemouth and District Electric Traction Company, Limited, John Street, Cullercoats, Northumberland, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tram Co., Cullercoats; T.N., 17 Whitley.] *Gen. Manager*, H. J. Smith *Sec.*, C. W. Francis; *Acting Sec.*, H. A. Stagg; *Chairman*, H. S. Day; *Directors*, J. H. Robinson, J. B. Williamson, R. J. Howley, Geo. J. Somerville.

Tyneside Tramways and Tramroad Company, Ltd., Neptune Bank, Wallsend. [T.A., Tramways, Wallsend; T.N., 84.] *Secretary & Res. Manager*, J. C. Little; *Elec. Eng.*, F. H. Briggs; *Cons. Eng.*, W. McLellan; *Chairman*, J. T. Merz; *Directors*, Lord Armstrong, J. H. Armstrong, G. E. Henderson, S. Hunter.

Wakefield and District Light Railway Company, Belle Isle, Wakefield.

[This company has been amalgamated with the Yorkshire (West Riding) Electric Tramways Co., Ltd.]

Walton-on-the-Naze Pier Tramway (Coast Development Corporation, Ltd.), The Pier, Walton-on-the-Naze. [T.A., Electricity Works, Walton-on-Naze.] *Eng.*, E. A. Lambert, A.M.I.E.E.

Wemyss and District Tramways Company, Ltd., Car Depot. Aberhill, Methill, N.B. [T.A., Tramways, Methill; T.N., 38 Leven.] *Gen. Manager*, W. T. Dawson; *Sec.*, J. O. Shepherd; *Chairman*, G. Balfour; *Directors*, W. Shepherd, G. Balfour, J. H. Guild.

Weston-super-Mare and District Electric Supply Co., Ltd., Locking Road, Weston-super-Mare, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Weston-s.-Mare; T.N., 79 & 181.] *Manager and Elec. Eng.*, G. Charlton; *Sec.*, H. A. Stagg; *Chairman*, G. J. Somerville; *Directors*, C. G. Tegetmeier, E. R. Soames.

Wolverhampton District Electric Tramways, Limited, Tramway Depot, Bilston, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Bilston; T.N., 56, Bilston.] *General Manager*, W. G. Bond; *Sec.*, E. H. Woodhall; *Chairman*, S. R. Blundstone; *Directors*, J. A. Lycett, R. J. Howley, B. Kingsford.

Worcester Electric Traction Company Ltd., St. John's, Worcester, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Worcester; T.N., 81.] *Engineering Manager*, R. Simpson; *Secretary*, C. W. Francis; *Acting Sec.*, H. A. Stagg; *Chairman*, H. S. Day; *Directors*, J. A. Lycett, B. Kingsford, W. S. Wreathall.

Wrexham and District Transport Co., Ltd., 6, Lord Street, Wrexham, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Wrexham; T.N., 182, Wrexham.] *Manager*, A. A. Hawkins; *Sec.*, J. R. Oliphant; *Acting Sec.*, J. S. Bowker; *Chairman*, J. V. Kitchener; *Directors*, G. J. Somerville, W. S. Wreathall.

Yorkshire (West Riding) Electric Tramways Co., Ltd., Belle Isle, Wakefield. [T.A., England, Belle Isle, Wakefield; T.N., 213.] *Gen. Manager and Sec.*, H. England; *Elec. Engs.*, C. J. Jewell and E. A. Wood; *Traffic Supt.*, W. J. McDonald; *Chairman*, Sir Herbert S. Leon, Bart.; *Directors*, B. Newgass, G. E. Leon, E. Remnant, W. Murray.

Yorkshire (Woollen District) Electric Tramways, Limited, Frost Hill, Liversedge, and Electrical Federation Offices, Kingsway, London, W.C. [T.A., Tramways, Heckmondwike; T.N., 8 Heckmondwike.] *Secretary*, P. N. Gray; *Chairman*, E. Garcke; *Directors*, Sir Thos. Pilkington, E. A. Paris (*managing*).

TRAMWAY ASSOCIATIONS.

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Offices: Sanctuary Chambers, Tothill Street, Westminster, London, S.W.
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LIST OF ELECTRIC TRAMWAYS & RAILWAYS.

PARTICULARS OF TRACK AND EQUIPMENT.

TRAMWAYS, pp. xxvii-xxx. RAILWAYS, p. xxx.

Location of Line and Name of Operating Company.	Date of Opening of First Section.	Length of Route.	Total length of Track.	Gauge.	Weight and Type of Rail.	Maximum Gradient.	Sharpest Curve.	No of Motor Cars.	No of Dynamos	No. of Engines	Type of Engines	Total Capacity Traction, kw.	Principal Contractors for Electrical Equipment.
TRAMWAYS.				ft. in.	lbs.	1 in	ft. rad.						
Aberdare Urban District Trys. ..	Oct., 1913	2·9	3·3	3 6	96 G	13	45	14	2	2	V. Cp. C.	400	Lanc. Dynamo Co.
Aberdeen Corporation	Dec., 1899	14·4	27·75	4 8½	96 G	13	42·5	83	*14	14	V. Cp. C.	4,610	British T-H. Macartney & Co.
Aberdeen Suburban Trys. Co. ..	June, 1905	5	5	4 8½	95 G	28	90	9	..	..	..	..	J. G. White & Co. Brush Co.
Accrington Corporation	Aug., 1907	7·53	10·53	4 0	95 G	14	..	32	*8	8	..	1,888	Brush Co.
Airdrie & Coatbridge Tramway Co.	Feb., 1904	3·63	4·94	4 8½	94 G	14	210	15	..	..	..	..	Brush Co.
Ashton-under-Lyne Corporation ..	Aug., 1902	7	8·15	4 7¾	96 G	10	40	25	5	5	..	400	Dick, Kerr, & Co. Siemens Bros.
Ayr Corporation	Sept., 1901	6	7·612	4 8½	90 G	21	45	24	*8	8	..	400	British T-H.
Bacup Corporation	1910	1·50	2	4 8½	103 G	9	40	..	..	..	..	..	
Barking Town Urban District ..	Dec., 1903	2·6	3·125	4 8½	100 G	25	44	9	4	3	V. Cp. C.	200	Blackwell & Co.
Barnsley & Dist. Elec. Traction Co.	Nov., 1902	3·06	4·25	4 8½	97 G	10	60	13	*	..	..	..	J. G. White & Co. Brush Co.
Barrow-in-Furness	Feb., 1904	6·9	10·32	4 0	90 G	13	50	24	*8	..	..	..	Brush Co. Dick, Kerr, & Co.
Bath Electric Tramways, Ltd. ..	Jan., 1904	14·7	19·3	4 8½	95 G	10·7	38	40	4	4	H.T. Cp.	675	Westinghouse
Batley Corporation	Aug., 1903	6·536	10·47	4 8½	104 G	9	40	15	6	4	H. Cp.	240	B. I. W. Co. British Elc. Cr. Co
Belfast City	Dec., 1905	49·65	98·54	4 8½	105 G	15	35	291	3	3	Tri. Exp.	3,000	J. G. White & Co. Westinghouse
Bessbrook—Newry (1) .. .. Bessbrook and Newry Try. Co.	Oct., 1885	3	3	3 0	41 V	80	55	(2 M 2 T)	2	1	Hyd. Turb.	..	Mather & Platt
Bexley Urban District	Oct., 1903	5·25	6·5	4 8½	90 G	14	40	21	3	3	V. Cp.	600	Dick, Kerr, & Co.
Birkenhead Corporation	Feb., 1901	13·8	24·09	4 8½	100 G	13½	40	65	6	6	V. Cp.	..	Blackwell & Co. British T-H.
Birmingham Corporation	Jan., 1904	65·56	123	3 6	105 G	13	40	586	..	..	..	1,475	Dick, Kerr, & Co.
Birmingham and Midland Trys. Co.	Nov., 1904	10·32	16·45	3 6	85 & 94 G	15	31	62	6	6	Cp.	..	Brush Co.
Blackburn Corporation	March, 1899	14·67	24·75	4 0	92 G	15	30	61	*4	4	V. Cp. C.	..	British T-H. Blackwell & Co.
Blackpool Corporation	Oct., 1885	14·75	21·38	4 8½	96 G	20	36	84	5	..	Turb.	3,250	Elwell-Parker British T-H.
Blackpool & Fleetwood Tramrd. Co.	July, 1898	7·9	15	4 8½	(70 V 98 G)	26	80	41	5	5	V. Cp.	600	Mather & Platt D.K. & Co.-B.T-H.
Blackpool and Fylde Light Ry. Co.	Under cons.	14	14·5	4 8½	..	..	..	..	..	..	..	..	
Blackpool—St. Anne's & Lytham ..	May, 1903	7·47	14·03	4 8½	92 G	22	35	40	..	..	..	..	British T-H.
Bolton Corporation	Nov., 1899	26	47·8	4 8½	90 G	14	35	112	*12	12	V. Cp. C.	3,800	Dick, Kerr, & Co. Blackwell & Co.
Bootle Corporation	May, 1900	4·125	7·75	4 8½	95 G	20	40	55	*8	8	..	4,000	Blackwell & Co.
Bournemouth Corporation	July, 1902	21·66	32·75	3 6	(100 G 66 slot)	10	40	91	5	4	V. Cp.	1,200	J. G. White & Co.
Bradford Corporation	July, 1898	59	108·75	4 0	102 G	9·8	40	‡272	11	11	V. Cp. C.	..	Westinghouse Blackwell & Co.
Bray and Enniskerry Railway Co.	Under cons.	3·25	5	3 6	..	..	..	..	..	..	..	..	
Brighton Corporation	Nov., 1901	9·48	17·19	3 6	(105 B.S. No. 4)	9	40	53	5	5	Turb.	1,000	Macartney & Co. Westinghouse Blackwell & Co.
Brighton Beach (1)	Aug., 1883	1·75	2	2 8½	35 V	100	80	9	2	..	..	..	Siemens Bros.
Bristol—Bristol Trys. Co.	Oct., 1895	31	57·5	4 8½	92½ G	10	30	232	6	4	V. Cp. C.	..	British T-H. and Blackwell & Co.
Burnley Corporation	Dec., 1901	12·50	22·16	4 0	102 & 107 G	9·8	35	67	*8	6	H. Cp. C.	1,500	British T-H.
Burton and Ashby Light Railway..	July, 1906	10·2	12·3	3 6	90 G	11	51	20	2	2	Diesel	330	Dick, Kerr & Co. Brush Co.
Burton-on-Trent Corporation ..	Aug., 1903	6·67	9·75	3 6	90 & 100 G	11·7	40	20	3	3	V. Cp.	400	Dick, Kerr, & Co. Blackwell & Co.
Bury Corporation	June, 1903	22·5	37·75	4 8½	102¾ G	12	40	54	6	6	..	1,500	Westinghouse
Camborne and Redruth	Nov., 1902	3·75	4	3 6	83 G	15	40	8	7	7	Cp.	1,525	Dick, Kerr, & Co. British T-H.
Cardiff Corporation	May, 1902	17·25	31·82	4 8½	100 G	23	35	130	9	9	V. Cp. C&T	2,200	British T-H. Dick, Kerr, & Co.
Carlisle, City of, Elec. Try. Co. ..	June, 1900	7·25	8·5	3 6	83 G	14	23	12	..	..	..	..	D.K. & Co.-B.T-H.
Cavehill & Whitewell Try. Co...	Feb., 1906	3·29	4·31	4 9	105 G	31	75	10	..	..	..	..	J. G. White & Co.
Chatham & District Light Rly. Co.	June, 1902	14·98	26	3 6	92½ & 105 G	9	35	50	5	4	H. Cp.	675	British T-H. Co. Brush Co.
Cheltenham and District ..	Aug., 1901	10·22	12·25	3 6	80 & 90 G	8·9	37	20	2	2	V. Cp.	..	Westinghouse
Chester Corporation..	April, 1903	3·59	6·4	3 6	94 & 100 G	23	40	18	*7	(6 1)	V. Cp. C. V. Tri. Ex C	240	Blackwell & Co. British T-H.
Chesterfield Corporation	Dec., 1904	3·6	5·1	4 8½	(96 & 101 G)	20	40	17	4	4	V. Cp. C.	800	Milnes & Co. Westinghouse Brush
Clontarf and Hill of Howth ..	July, 1900	5·5	6·5	5 3	90 & 60 G	13	34	12	..	..	..	..	W.M. Murphy & Co.
Colchester Corporation	July, 1904	6	7·94	3 6	95 G	12	43	18	8	8	V. Cp.	1,140	Dick, Kerr & Co. J. G. White & Co.
Colne Corporation Tramways ..	Nov., 1903	5·2	6·7	4 0	102 G	13	60	13	*	..	..	..	Blackwell & B.T-H.
Cork Elec. Try. & Lighting Co. ..	Dec., 1898	10	15	2 11½	83 G	14	26	35	*9	9	H. Cp. C.	570	Glover & Co. British T-H. Blackwell & Co.
Coventry Corporation Tramways..	Dec., 1895	12·88	15·81	3 6	(65 G 81 G)	16	35	51	5	3	H. & V. Cp.	1,500	Westinghouse Blackwell & Co.
Croydon Corporation	Sept., 1901	11·87	19·12	4 8½	96·5 G	16	40	75	*13	13	..	2,000	British T-H. Co.
Darlington Corporation	June, 1904	4·875	8·88	3 6	90 G	14	52·8	18	1	..	..	250	Westinghouse

* Current from combined lighting and traction station. (1) Third rail system. † Includes 1·25 miles railless trolley line. ‡ Includes 20 railess cars.
M—Motor Cars. T—Trail Cars.

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ELECTRIC TRAMWAYS & RAILWAYS.—Particulars of Track and Equipment.

Location of Line and Name of Operating Company.	Date of Opening of First Section.	Length of Route.	Total Length of Track.	Gauge.	Weight and Type of Rail.	Maximum Gradient.	Sharpest Curve.	No. of Motor Cars	No. of Dynamos	No. of Engines.	Type of Engines.	Total Capacity Traction, kw.	Principal Contractors for Electrical Equipment.
TRAMWAYS—*continued.*				ft. in.	lbs.	1 in	ft. rad.						
Dartford U. D. C.	Feb., 1906	6·5	8·5	4 8½	100 G	12	35	12	4	..	..	..	British I. W.
Darwen Corporation	Oct., 1900	4·36	7·16	4 0	95 G	9	35	19	*4	4	H. Cp.	..	British T-H.
Derby and Ashbourne	..	14·5	..	4 8½									
Derby Corporation	July, 1904	13	22·25	4 0	95 G	14	46	50	3	3	Turb.	..	J. G. White & Co. Brush & B.T-H.
Devonport Corporation	June, 1901	..	7	3 6	97 G	10	50	12	..	..	..	..	Blackwell & Co.
Doncaster Corporation	June, 1902	8·25	12·52	4 8½	94 G	16	45	32	8	8	..	1,000	Blackwell & Co.
Dover Corporation	Sept., 1897	4·75	7	3 6	87 & 90 G	10	44	24	*2	2	H.CC.	..	D. K. & B. T-H
Douglas—Port Soderick .. Douglas Southern Elec. Trys. Co.	Aug., 1896	3·25	3·75	4 8½	65 V	12	45	8 M 8 T	2	2	H. Cp.	200	Westinghouse British T-H.
Dublin & Lucan Elec. Railway Co.	March, 1900	6·5	7	3 6	50 V	20	27	9 M 5 T	2	2	H. Cp. C.	240	Dick, Kerr, & Co.
Dublin United Tramways Co.	May, 1896	49·8	100·75	5 3	105 G	12·3	22	365	8	8	Cp. & Tur	5,500	Dick, Kerr, & Co. Blackwell & Co. British T-H.
Dudley and Stourbridge Trys. British Electric Traction Co.	July, 1899	22·88	30·97	3 6	90 G	11	50	59	4	4	H. Cp.	..	British T-H. Blackwell & Co.
Dumbarton	Feb., 1907	13	17	4 7¾	90 & 96	14	60	30	3	3	..	..	Dick, Kerr, & Co. White & B.T-H.
Dundalk	Under cons.	6	6·25	3 6	97 G	10	50	12					
Dundee, Broughty Ferry, and District	Dec., 1905	4·125	7·25	4 8½	90 G	16·5	30½	14	3	3	V. Cp. C.	..	J. G. White & Co British T-H. Co.
Dundee Corporation	July, 1900	16·3	30·12	4 8½	90 & 100 G	10	35	76	5	5	..	..	Blackwell & Co.
Dunfermline (Fife Try. & Power Co.)	Nov., 1909	14·6	17·4	..	90 G	10	25	28	..	..	..	..	British T-H.
East Ham Corporation	June, 1901	7·58	14·20	4 8½	90 & 105 G	25	40	45	*5	5	H. Cp.	750	Dick, Kerr, & Co.
Eccles Corporation	May, 1902	5	7·75	4 8½	100 G	..	..	..	..	..	..	..	
Edinburgh and District	June, 1910	1·25	1·5	4 8½	100 G	21	54	4	..	..	..	..	Dick, Kerr, & Co.
Erith Urban District Council	Aug., 1905	4·7	8·4	4 8½	100 G	17	40	17	3	5	..	..	Brush Co. Westinghouse Co.
Exeter Corporation	April, 1905	4·875	7	3 6	90 G	11·5	35	24	*4	4	H. Cp.	..	Dick, Kerr, & Co.
Falkirk and District	Oct. 1905	7·81	10·5	4 0	90 G.	11·3	48	18	*	..	..	..	Bruce-Peebles British T-H.
Farnworth Urban District	Jan., 1902	4·33	7·16	4 8½	98 G	29	36	..	..	..	..	..	
Felixstowe Pier	Aug., 1905	0·5	0·5	3 6	36	..	..	3	..	..	..	..	
Gateshead and District	May, 1901	12·38	20·02	4 8½	90 G	8	35	55	*	..	..	..	Dick, Kerr, & Co. Blackwell & Co.
Giant's Causeway Elec. Try. Co.	Sept., 1883	8	9	3 0	42 V 75 G	24	30	5 M 21 T	2	2	Hyd. Turb.	..	Siemens Bros. British T-H.
Glasgow Corporation	Oct., 1898	99·26	198·25	4 7¾	110 G	11·93	30¾	857	8	8	V. Cp. & T	21,700	British T-H. Westinghouse
Glossop Urban District	Aug., 1903	4·56	5·6	4 8½	90 G	13	40	8	4	4	V. Cp.	200	British T-H.
Gloucester Corporation Light Rly.	May, 1904	9	15	3 6	90 G	25	40	30	*2	2	Cp.	750	Brush Co. Dick, Kerr, & Co.
Gosport & Fareham Trys. Co.	Jan., 1906	7·5	11·5	4 7¾	96 G	16	37½	22	3	3	V. Cp. C.	750	Dick, Kerr, & Co. Brush Co.
Gravesend and Northfleet	Aug., 1902	6·5	9	4 8½	87 G	11	45	18	*				
Great Crosby	June, 1900	2·5	2·5	4 8½	92½ G	..	40	14	*7	7	H. & V. Cp.	160	Dick, Kerr, & Co. Blackwell & Co.
Great Grimsby	Dec., 1901	6	11	4 8½	90 G	15	26	32 M 6 T	3	3	..	400	Dick, Kerr, & Co.
Greenock and Port Glasgow	Oct., 1901	7·425	14·05	4 7¾	90 G	11	60	42	*	..	..	..	
Guernsey Railway Co.	Nov., 1892	3	3	4 8½	74 V 84 G	60	60	9 M 8 T	2	1	H. & V. Cp.	160	Siemens Bros. British T-H.
Halifax Corporation	June, 1898	37·53	55·5	3 6	95½ G	9·5	38·6	101	*7	7	H. & V. Cp. & T.	3,000	Electric Cons. Co. British T-H.
Hampshire Light Railway (Elec.) Co.	March, 1903	6	9	4 8½	..	..	..	10	*	..	..	..	
Haslingden Corporation	July, 1908	3	3	4 0	100 G	10	30	..	..	..	..	45	Dick, Kerr, & Co.
Hastings and District	July, 1905	19·33	33·25	3 6	90 G	8	30	65	6	6	V. Cp.	2,100	Dick, Kerr, & Co.
Herne Bay Pier (1)	March, 1899	·75	·75	3 0	60	..	..	3	1	1	Gas	50	British T-H.
Heywood Corporation	Dec., 1905	4·25	4·25	4 8½	90 G	17	..	..	1	1	..	300	Blackwell & Co. B.I. & H.C. Co.
Houghton-le-Spring (See Sunderland Dist. Elec. Trys.)													
Huddersfield Corporation	Feb., 1901	34·50	56	4 7¾	98 G	11	35	106	4	4	V. Cp. C.	2,200	British T-H.
Hull Corporation	July, 1899	13·46	29·5	4 8½	94 G	20	30	180	7	7	V. Cp. C.	2,560	British T-H. Westinghouse
Ilford Urban District	Mar., 1903	7·42	12·62	4 8½	95 G	13	33·3	28	*7	7	..	1,600	British T-H. Dick, Kerr, & Co.
Ilkeston Tramways	May, 1903	3·8	4·3	3 6	90 G	12	28	13	..	..	..	..	Dick, Kerr, & Co.
Ipswich Corporation	Nov., 1903	10·8	14·87	3 6	90 G	11·5	40	36	*10	10	Enclos'd	1,175	Westinghouse
Isle of Man— Manx Elc. Rly. Co. Douglas to Ramsey	July, 1893	18	35·75	3 0	62½ V	24	90	34 M 29 T	8	9	H. Cp.	1,300	Mather & Platt
Manx Elc. Rly. Co. Snaefell Mountain	Aug., 1895	4·5	9·5	3 6	56 V	12	90	6	5	4	H. Cp.	390	
Isle of Thanet Trys. & Ltg. Co.	April, 1901	11	20·67	3 6	90 & 100 G	11	38	59	*6	6	3 V. Cp. 3 H. Cp.	800	British T-H. Blackwell & Co.
Jarrow and District	Nov., 1906	2·54	3·42	4 8½	95 G	12·5	50	10	..	..	..	..	Brush Co. B.I. & H.C. Co.
Kearsley Urban District	Jan., 1902	1·75	1·75	4 8½	95 G	20	..	..	..	..	..	..	Westinghouse
Keighley Corporation	Oct., 1904	3·5	6·11	4 0	95 G	25	60	12	*4	4	V.	200	Blackwell & Co.
Kidderminster—Stourport British Electric Traction Co.	May, 1898	4·6	4·87	3 6	75 G	14	45	13	*5	5	Stm Turb.	..	Brush & B.T-H. Brush Elc. Eg. Co
Kilmarnock Corporation	Dec., 1904	4·18	5·5	4 8½	90 G	24	45	14	*3	3	..	250	Blackwell & Co.
King's Norton & Northfield U. D.	May, 1904	5·25	8·25	3 6	105 G	15&21	100&145	..	..	..	..	..	Blackwell & Co.
Kinver	April, 1901	4·25	6	3 6	63 & 90 G	..	..	6					
Kirkcaldy Corporation	Feb., 1903	6·11	8·56	3 6	100 G	11	40	26	*10	6	Cp. H.T.	2,290	British T-H. Co.
Lanarkshire Tramway Co.	July, 1903	28·431	43·120	4 7¾	96 & 101 G	9·4	37	76	4	4	3 H. Cp. 1 V. Cp.	825	British T-H. Co.
Lancashire United Tramways Co.	Oct., 1902	39	42	4 8½	90 G	15	50	82	*8	8	V. Cp. C&T	7,000	B. I. W. Co.
Lancaster Corporation	Jan., 1903	4	4·81	4 8½	90 G	8	30	12	4	4	V. Cp.	200	Greenwood & Batley, Ltd.
Leamington & Warwick Elec. T. Co.	July, 1905	3·04	6·1	3 6	65 G	12	47	12	3	3	Cp.	..	Brush Co.
Leeds City	Aug., 1897	69·02	126·75	4 8½	105 & 111 G	8·4	32	345	5 3	5 3	H. Cp. C. Stm. Tur	6,150	Elec. Con. Co. Greenwood & Batley, British T-H. Blackwell & Co.

* Current from combined lighting and traction station. (1) Third Rail system. M—Motor Cars. T—Trail Cars.

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ELECTRIC TRAMWAYS & RAILWAYS.—Particulars of Track and Equipment.

Location of Line and Name of Operating Company.	Date of Opening of First Section.	Length of Route.	Total length of Track.	Gauge.	Weight and Type of Rail.	Maximum Gradient.	Sharpest Curve.	No. of Motor Cars.	No. of Dynamos	No. of Engines	Type of Engines.	Total Capacity Traction, kw.	Principal Contractors for Electrical Equipment
TRAMWAYS—*continued.*				ft. in.	lbs.	1 in	ft. rad.						
Leicester Corporation	May, 1904	20·25	38	4 8½	100 G	16	35	160	7	7	V.Cp.C&T	9,250	Dick, Kerr, & Co. / Blackwell & Co.
Leith Corporation	Aug., 1905	9·08	17·9	4 8½	106·7 G	19	54	37	*11	11	..	1,600	Brush & B.T-H.
Leyton Urban District	Dec., 1906	8·95	17·694	4 8½	105 & 111 G	24	45	60	*4	4	Cp.T.E&T	2,040	..
Lincoln Corporation (1)	Nov., 1905	1·75	2·96	4 8½	100 G	..	36	8	*9	9	..	120	Blackwell & Co.
Liverpool Corporation	Nov., 1898	70	124	4 8½	95, 123 & 134 G	13	30	599	*42	42	Trip.Ex.	44,600	British T-H. / Dick, Kerr, & Co. / Westinghouse
Liverpool Overh'd Ry. (Trol.Ln.Ex.)	June, 1900	2·5	2·5	4 8½	92½ G	Nil	40	14	7	7	H.&V.Cp.	160	Dick, Kerr, & Co.
Llandudno and Colwyn Bay ..	Oct., 1907	8·37	13·60	3 6	90 G	11·5	45	18	*	..	..	..	Bruce-Peebles.
Llanelly and District	July, 1911	6·25	6·75	4 8½	90 G	11·2	60	12	*2	2	Trip.Ex.	..	British T-H.
London County Council (2) ..	May, 1903	148·56	287·35	4 8½	105 G	10·6	45	172M / 150T	8	8	V.Cp.C. / Turbine	43,000	Dick, Kerr, & Co. / Westinghouse
London United Tramways Co. ..	April, 1901	55·25	102·45	4 8½	92½ & 100 G	18	28	339	7	5	V. Cp.	3,500	British T-H. / Westinghouse. / Blackwell & Co.
Lowestoft Corporation	July, 1903	4·75	5·07	3 6	100 G	27	36	19	*5	5	Cp.	..	Blackwell & Co.
Luton Corporation Tramways (Leased to J. G. White & Co., Ltd.) ..	Feb., 1908	5·25	6·25	4 8½	95 G	11	35	12	*1	1	..	..	J. G. White & Co. / British T-H.
Maidstone Corporation	July, 1904	5·5	7·04	3 6½	96 G	9	35	19	3	3	..	750	Dick, Kerr & Co.
Manchester Corporation	June, 1901	120·05	244	4 8½	105 G	14·9	35	685	*22	22	Turb'nes	45,300	British T-H. / Dick, Kerr, & Co.
Mansfield and District Co. ..	July, 1905	10	12·25	4 8½	90 G	17	50	24	*3	3	..	..	D. K. & B. T-H
Merthyr	April, 1901	3·69	4·81	3 6	96 G	11	66	16	*4	4	H.S.V.	..	British T-H.
Metropolitan Electric Trys., Ltd.	July, 1904	56·25	112·5	4 8½	100 G	12	40	312	5	5	1 Stm. Tur	..	Brush Co.
Mexborough & Swinton Trys. Co.	Feb., 1907	7·75	10·75	4 8½	90 G	8·5	55	20	4	4	Turb.	700	Brush & B.T-H.
Middlesbro', Stockton, & Thornaby Electric Tramways Co.	July, 1898	10·5	15·825	3 6	92½ G	17	35	60	3	4	H.&V.Cp.	900	British T-H. / Blackwell & Co.
Middlesex County Council.. ..	Aug., 1904	25·5	51	4 8½	..	..	..	..	..	..	..	..	
Middleton Corporation	March, 1902	2·5	5	4 8½	..	..	..	..	..	..	..	..	
Middleton Electric Traction Co. ..	March, 1902	8·5	10·53	4 8½	90 G	15	49½	28	3	3	..	500	Glover & Co.
Morecambe	Jan., 1912	1·20	..	4 8½	96 G	18	..	4	..	..	..	..	
Musselburgh and District ..	Dec., 1904	6·5	8·125	4 8½	90 G	34	45	16	4	3	..	400	B. T-H. Co., Nat. Elec. Cons. Co.
Nelson Corporation	Feb., 1903	2·74	3·86	4 0	106 G	11	41	11	*4	4	..	400	Blackwell & Co. / British T-H. Co. / Brush Co.
New St. Helens & District Trys.Co.	July, 1899	18	20	4 8½	95 G	13	35	36	*4	4	V.Cp.C.	..	Westinghouse / British T-H.
Newcastle Corporation	Dec., 1901	32·75	69·5	4 8½	101 G	11	37	220M / 2T	6	6	V.Cp.Trip. Ex.&Turb.	11,000	Westinghouse / British T-H.
Newport (Mon.) Corporation ..	April, 1903	7·5	14·35	4 8½	98 G	10·5	40	44	5	5	V. Cp.	1,750	Westinghouse
Northampton Corporation	July, 1904	6·5	12·5	3 6	90 & 96 G	18	50	33	4	4	V.C.C.&T	1,020	Dick, Kerr, & Co. / Brush Co.
North Shields Tramways Co. ..	March, 1901	..	7·75	3 6	90 G	10	36	22					
North Staff. Trys. (*vide* Potteries)													
Norwich Electric Tramways Co. ..	July, 1900	14·5	19·25	3 6	65½ & 90 G	12·6	38	42	6	5	H.TCp&T	1,000	Westinghouse / Blackwell & Co.
Nottingham Corporation	Jan., 1901	21·5	40·3	4 8½	107 G	11·5	40	155	*3	3	..	..	British T-H. / Dick, Kerr, & Co.
Nottinghamshire & Derbyshire Tramways Co.	Aug., 1913	12·8	16·10	4 8½	G	..	..	24	*	..	..	..	British T-H.
Oldham, Ashton & Hyde Trys. Co.	June, 1899	9·12	11·75	4 8½	97 G	11	28	46	*3	3	V.Cp.C.	..	British T-H.
Oldham Corporation	Dec., 1900	24	37	4 8½	100 & 105 G	10·5	40	109	*4	4	..	2,220	Dick, Kerr, & Co.
Paisley & District Tramways Co.	June, 1904	18·25	32·50	4 7⅞	90 G	10	34	60	..	..	..	..	British T-H.
Perth Corporation	Oct., 1905	4·846	6·75	3 6	90 G	16	25	12	5	5	Cp.	500	Blackwell & Co.
Peterborough Elec. Traction Co...	Jan., 1903	5·33	6·71	3 6	94 G	31	35	14	..	..	..	..	Blackwell & Co. / Dick, Kerr, & Co.
Plymouth Corporation	Sept., 1899	7·75	15	3 6	92 G	9	35	42	3	3	V. Cp.	..	Elec. Cons. Co. / Westinghouse
Plymouth, Stonehouse, and Devonport	Nov., 1901	1·5	3·62	3 6	84 G	11	34	15	..	..	..	..	Blackwell & Co. / Dick, Kerr, & Co.
Pontypridd Urban District ..	March, 1905	5·5	8·6	3 6	96 & 100 G	10	27·6	26	4	5	V.C.Cp.	450	B.I.W. & B.T-H. / Blackwell & Co.
Portmadoc & South Snowdon Rly.	Under cons.	13·25	15	1 11½	41	28	200	6	..	..	..	..	
Portsdown & Horndean Tramway	March, 1903	6	7·5	4 7⅞	96 G	16	40	16	2	2	Oil	200	Dick, Kerr, & Co. / Brush Co.
Portsmouth Corporation	Sept., 1901	17·65	34·63	4 7⅞	96 & 100 G	17	35	100	5	4	V.& H.Cp.	2,075	Macartney & Co. / Dick, Kerr, & Co.
Potteries Electric Traction Co. ..	May, 1899	31·67	41·48	4 0	87, 90, 100, & 110 G	11	45	110	8	8	H.Cp. / V.Cp.	2,275	Dick, Kerr, & Co. / Blackwell & B.T-H.
Preston Corporation..	June, 1904	10·54	17·2	4 8½	B.S.S. No. 2	16	28	39	2	2	H. Cp.	600	Dick, Kerr, & Co.
Radcliffe Urban District ..	April, 1905	5	6·5	4 8½	100 G	15	40	..	*4	4	V. Cp.	600	Mather & Platt
Rawtenstall Corporation	May, 1909	12	15·9	4 0	100 G	15	38	24	*3	3	..	850	Westinghouse
Reading Corporation	July, 1903	7·44	13·175	4 0	96 G	16	35	36	4	4	V. Cp.	400	Blackwell & Co. / Dick, Kerr, & Co. / Westinghouse
Rhondda Tramways Co.	July, 1908	21	28·75	3 6	95 G	9	38½	54	7	4	Trip.Ex.	1,230	British T-H. / Brush
Rochdale Corporation	May, 1902	19·58 (A)	40 (A)	4 8½	103½ G	11·7	30	69	*	..	..	..	British T-H. / Dick, Kerr, & Co. / Brush Co.
Rotherham Corporation	Jan., 1903	10	12	4 8½	100 G	9·5	45	36	*6	6	H.S.Cp.	1,485	Dick, Kerr, & Co.
Rothesay	June, 1902	4·81	9·68	3 6	94 G / 77 G	24	34	20	3	3	V. & Oil	350	Dick, Kerr, & Co. / Westinghouse
Ryde Pier, Isle of Wight Ryde Pier Co. (3) ..	March, 1886	·5	1	4 8½	30 & 34 V	..	..	4	2	2	Gas	..	Siemens Bros.
Salford Corporation	Oct., 1901	41·90	75·79	4 8½	103 G	20	42·5	220	*7	7	C. & Turb.	3,000	Westinghouse / Mather & Platt
Scarborough Tramways Co. ..	May 1904	5	7·75	3 6	90 G	10·5	35	22	2	2	Stm.Turb.	..	Brush & B.T-H.
Sheerness and District	April, 1903	2·5	2·704	3 6	94 G	43	40	8	6	5	V.Cp.C.	100	Siemens & Halske / Brush Co.
Sheffield Corporation	Sept., 1899	40	77·84	4 8½	110 & 120	9·5	35	339	..	..	..	..	British T-H.

* Current from combined lighting and traction station. (1) G.B. surface contact system. (2) Mainly Conduit system, but there are now several Trolley lines.
Besides the electric lines the London County Council has also 4·45 route miles of horse tramways. (3) Third rail system. (A) Not including 17·1 miles track leased.
M—Motor Cars. T—Trail Cars.

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ELECTRIC TRAMWAYS (contd.).	Date of Opening of First Section.	Length of Route.	Total Length of Track.	Gauge.	Weight and Type of Rail	Maximum Gradient.	Sharpest Curve.	No. of Motor Cars.	No. of Dynamos	No. of Engines.	Type of Engines.	Total Capacity Traction, KW.	Principal Contractors for Electrical Equipment.
				ft. in.	lbs.	1 in	ft. rad.						
Shipley Urban District	May, 1902	6	10	4 0	98 G	15	..	..	6	6	Turbine	1,800	British T-H.
Soothill Nether U.D.C. & Dewsbury & Ossett Corporations	Nov., 1908	3·125	4·45	4 8½	90 G	13	50	8	*	..	..	..	Nat. Elec. Cons. Co.
Southampton Corporation	Jan., 1899	10·25	18·75	4 8½	96 G & 105 B.S. No. 4	13	40	73	6	6	H. Cp. C.	1,000	Westinghouse
Southend Corporation	July, 1901	7·01	15·2	3 6	90 G	18	48	42	*6	7	V. Cp.	2,075	British T-H.
Southend Pier (1) Southend Corp.	Aug., 1890	1·25	1·25	3 6	60 G	Lev.	..	28	..	..	..	..	British T-H.
South Metropolitan Elec. Try. Co.	Feb., 1906	13·09	26	4 8½	95 G	16	42	51	*8	6	Stm Tbs	1,650	Dick, Kerr & Co. / Brush Co.
Southport Corporation (5)	July, 1900	13·5	10·75	4 8½	87 & 90 G	25	45	30	*3	3	H. Cp.	600	Dick, Kerr, & Co.
Southport Electric Tramway Co.	July, 1901	8·17	12·52	4 8½	87 G	Nil	40	21	*				
Southport Pier	1905	..	·75	4 0	..	..	..	1 M 2 T	..	..	..	..	Westinghouse
South Shields Corporation	March, 1906	5·7	10·25	4 8½	95 G	15	35	40	2	2	V. Cp. C.	1,100	Dick, Kerr & Co.
South Staffordshire	Jan., 1893	16·90	26·87	3 6	97 & 90 G	17	46	46	3	3	C. H. Cp.	..	Blackwell & Co. / E. C. C
Stalybridge, Hyde, Mossley, and Dukinfield	May, 1904	21·186	27·75	4 8½	99 G	9	27½	59	8	..	Turb.	1,000	Dick, Kerr, & Co.
Stockport Corporation	Aug., 1901	16	27·62	4 8½	96 G	10·8	35	50	*5	5	Cp.	1,000	Dick, Kerr, & Co.
Sunderland Corporation	Aug., 1900	10·92	20·35	4 8½	96 G	12	36	70	*	..	..	936	Dick, Kerr, & Co.
Sunderland District Electric Trys.	June, 1905	14·27	15·97	4 8½	90 G	11	40	33	*	..	..	..	British T-H.
Sutton & Howth (G.N.R., Ireland)	June, 1901	5·3	6	5 3	72 B	16·7	300	11	3	3	V. Cp.	500	British T-H. / Westinghouse
Swansea Tramways Company	June, 1900	13·02	20·38	4 8½	84 & 86 G	14	45	75	3	3	H. Cp. C.	620	British T-H.
Swindon Corporation	Sept., 1904	3·7	4·4	3 6	105 G	14	37	12	5	4	..	600	Dick, Kerr & Co.
Taunton Electric Traction Co.	Aug., 1901	1·66	2	3 6	90 G	25	35	6	*	..	..	..	Blackwell & Co.
Torquay Tramways	April, 1907	9·76	17·04	3 6	90 G	10	31	33	*	..	..	..	British T-H.
Trafford Park Estates, Ltd. (Trys.)	July, 1903	2·5	2·75	4 8½	100 G	Nil	35	..	..	..	..	..	
Tynemouth and District	March, 1901	4·21	7·83	3 6	90 G	10	30	21	*3	3	..	..	Blackwell & B.T-H.
Tyneside Tramways & Tramroads Co.	Sept., 1902	10·97	16·23	4 8½	95 G	10	40	24	*				
Wallasey Corporation	March, 1902	12	20	4 8½	98 G	11	40	67	*1	1	Turbine	1,000	Blackwell & Co.
Walsall Corporation	Jan., 1904	13·5	19·5	3 6	90 & 92 G	18·5	32	39	*7	7	V. & Tur.	2,490	British T-H.
Walthamstow U.D.C. Light Rly.	June, 1905	9·14	12·53	4 8½	100 G	18	40	38	*15	12	Gas & Turb's	1,560	Westinghouse
Walton-on-Naze Pier	Aug., 1898	·5	·5	3 6	36 V	..	..	3	3	2	..	100	Blackwell & Co.
Warrington Corporation	April, 1902	6·5	9·6	4 8½	90 G	27	50	21	*6	6	V.C.	500	British T-H.
Wemyss and District	Aug., 1906	7·5	13	3 6	95 & 97 G	18	85	17	3	3	2 V. Cp.	..	Bruce Peebles & Co.
West Bromwich Corporation	Dec., 1902	7	12·5	3 6	98 G	20	49	29	8	8	Turb'nes	750	Dick, Kerr, & Co.
West Ham Corporation	Feb., 1904	16·8	30·0	4 8½	100 G	18	40	118	*3	3	V. C. Cp.	1,500	B. I. W. Co. / Brush & B.T-H.
West Hartlepool Corporation	May, 1896	6·72	8.3	3 6	87 & 90 G	15	35	25	*	..	..	..	Elec. Cons. Co. / Dick Kerr & Co.
Weston-super-Mare	May, 1902	2·92	3·53	4 8½	90 G	25	40	12	5	4	Cp. & T.	..	Blackwell & Co. / British T-H. / Brush Co.
Wigan Corporation	Jan., 1901	30·9	45·42	3 6 / 4 8½	105 G	12	45	73	*8	8	..	740	Blackwell & Co.
Wolverhampton Corporation (3)	April, 1902	13·5	22	3 6	91 G	15	37·5	52	*10	10	H. & V.C. & Turb's	2,900	British T-H. / Electric Cons. Co.
Wolverhampton District	Oct., 1900	15·51	22·72	3 6	90 G	20	40	30	*4	..	..	..	B.I.W. & B.T-H. / Westinghouse
Worcester Electric Traction Co.	Feb., 1904	5·86	8·58	3 6	94 G	13	45	15	*3	3	..	..	Brush Co. / Dick, Kerr, & Co.
Wrexham and District	April, 1903	4·44	6·16	3 6	96 G	9·11	50	10	*6	..	..	..	British T-H.
Yarmouth Corporation	June, 1902	10	14·4	3 6	90 & 95 G	27	48	35	3	3	Comp.	..	Brush Co. / B.I.W. Co.
York Corporation	Jan., 1910	6	9·9	3 6	100	18	40	3 M. 4 T.	*8	8	V.C.	..	Dick, Kerr, & Co. / Brush & B.T-H.
Yorkshire (West Riding)	Aug., 1904	24·69	40·382	4 8½	96 G	15·5	40	69	9	6	..	1,800	Dick Kerr & Co.
Yorkshire Woollen District	Feb., 1903	22·25	36	4 8½	94 & 100 G	8	30	69	*	..	..	..	Brush Co. / Dick, Kerr, & Co.
RAILWAYS.													
LONDON AND VICINITY:													
Central London Rly. Co. (1)	July, 1900	6·5	13	4 8½	100 V	30	..	68 M. 172 T.	6	6	H. Cp. C.	..	British T-H
City & South London Rly. Co. (1)	Dec., 1890	7·25	14·75	4 8½	60 V / 80 V	30	120	52 L. 142 T.	(a)	..	..	..	Mather & Platt. / Elec. Cons. Co. / British T-H.
East London Railway (2)	April, 1913	5·75	11·5	4 8½	90 B	..	..	(c)	..	..	..	..	
Gt. Northern & City Rly. Co. (2)	Feb., 1904	3·5	7·75	4 8½	85 V	52	660	35 M 45 T	6	..	..	..	British T-H.
Great Western Railway (Hammersmith and City line.)	Nov., 1906	4·9	10·5	4 8½	97½ B	60	400	40 M. 80 T	10	10	V. Cp.	..	British T-H. / Elec. Con. Co.
London & North Western Rly. (Euston-Watford line in progress) (2)	May, 1914	41·5	80	4 8½	..	..	..	..	..	..	Turbine	..	Siemens Works / Westinghouse
London & South Western Rly.	Nov., 1915	47	150	4 8½	..	..	168	84	..	..	Turbine	..	Dick, Kerr & Co. / British T-H. / Westinghouse
London, Brighton, and South Coast Railway (4) (Extensions in progress)	Dec., 1909	22	70	4 8½	..	..	..	16 M. 8 T.	*(d)	..	..	..	British T-H. / Blackwell & Co.
London Electric Railway Co.: Baker St. & Waterloo Ry. (2)	March, 1906	7	14·0	4 8½	90 B	60	330	86 M. 72 T.	(a)	..	..	..	Westinghouse / British T-H.
Charing Cross—Hampstead Railway (2)	June, 1907	8	16·5	4 8½	90 B	33	330	60 M. 90 T.	(a)	..	..	..	Westinghouse / British T-H.
Great Northern, Piccadilly & Brompton Rly. (2)	Dec., 1906	9·25	18·5	4 8½	90 B	33	330	72 M. 144 T.	(a)	..	..	..	Westinghouse / British T-H.
Metropolitan Railway (2)	Jan., 1905	26	59	4 8½	86 B	44	363	86 M. 172 T.	4	4	Turbine	..	Westinghouse / British T-H.
Metropolitan District Railway (and running powers) (2)	July, 1905	41	80·46	4 8½	86 B	40	330	234 M. 286 T.	(a)	..	Turbine	..	British T-H. / Westinghouse
Waterloo and City Rly. (1)	Aug., 1898	1·5	3	4 8½	87 B	30	321	17 M. 12 T.	6	6	V. C.	..	Siemens Bros. / Dick, Kerr & Co.
PROVINCES:													
Lancashire and Yorkshire (2) (Extensions in progress)	March, 1904	43	85	4 8½	86 B	85	840	38 M. 52 T.	6	5	1 V.C. / 4 H.C.	..	Dick, Kerr, & Co.
Liverpool Overhead Rly. Co. (1)	March, 1893	6·5	13·05	4 8½	60 V	40	429	46 M 7 T	7	7*	H.Cp. / V.Cp.	..	Electric Cons. Co. / Dick, Kerr, & Co.
Mersey Railway (1)	April, 1903	4·5	9	4 8½	86 B	27	528	24 M. 37 T.	5	5	V.Cp.	..	Westinghouse
Midland Rly.—Morecambe and Heysham Branch (4)	June, 1908	9·75	19·5	4 8½	..	..	..	3 M. 6 T.	4	4	Gas.	..	Westinghouse / Siemens Bros.
North Eastern Railway (1)	March, 1904	..	..	4 8½	90 B	..	..	..	(b)	..	..	..	British T-H. Co.

*Power from combined lighting and power station. (1) Third rail system. (2) Third and fourth rails system. (3) Lorain surface contact system. (4) Single phase.
(5) Not including 9 miles owned but leased. (a) Power supplied by Chelsea Power Station (80,000 H.P.) (b) Power purchased from the Newcastle-upon-Tyne Electric Supply Company, Limited. (c) Rolling stock supplied by Metropolitan Railway. (d) Power supplied by London Electric Supply Corporation.
M—Motor Cars. T—Trail Cars.

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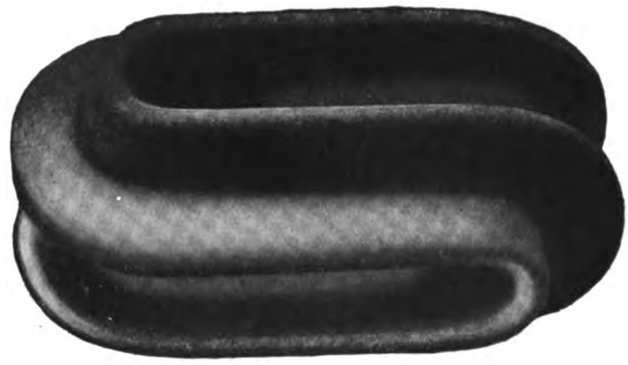

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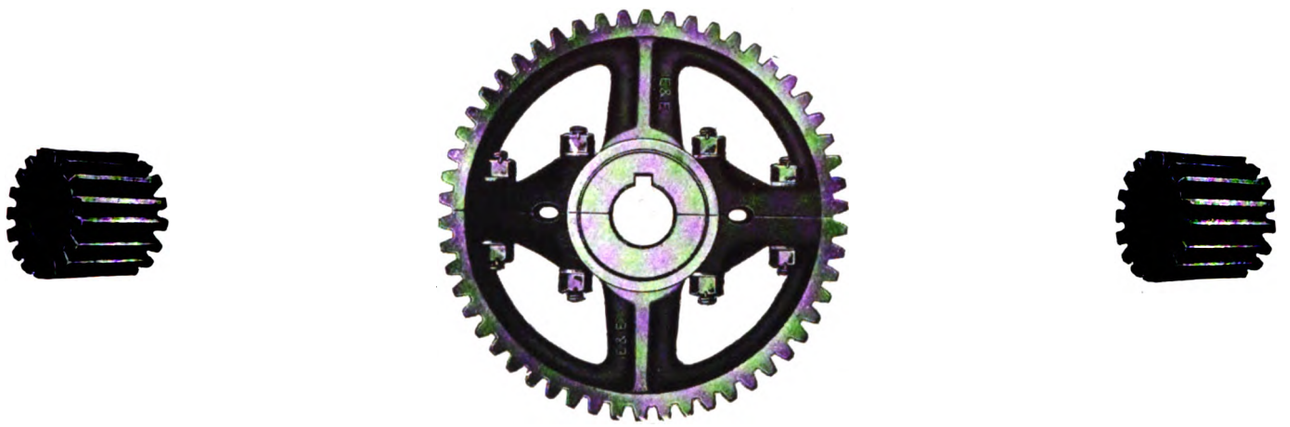

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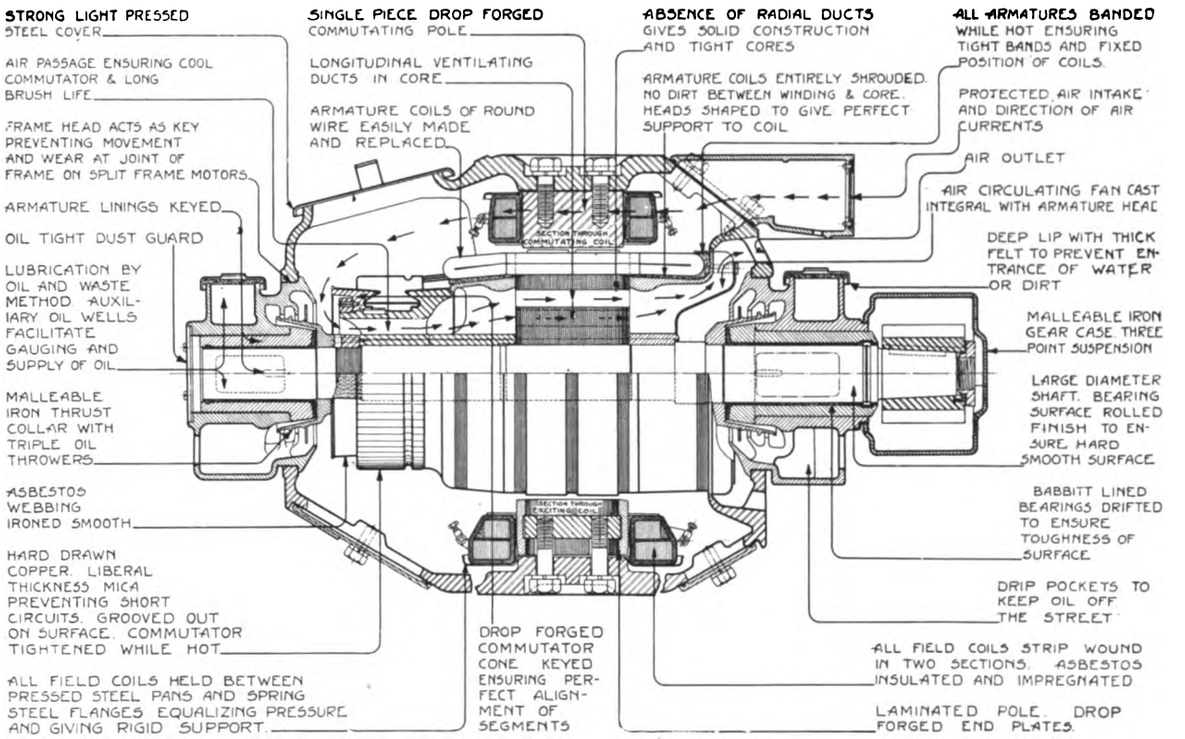
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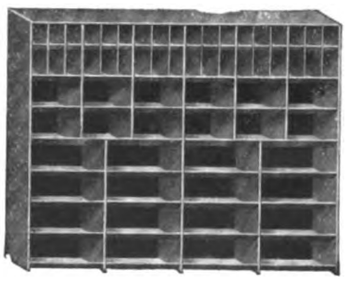

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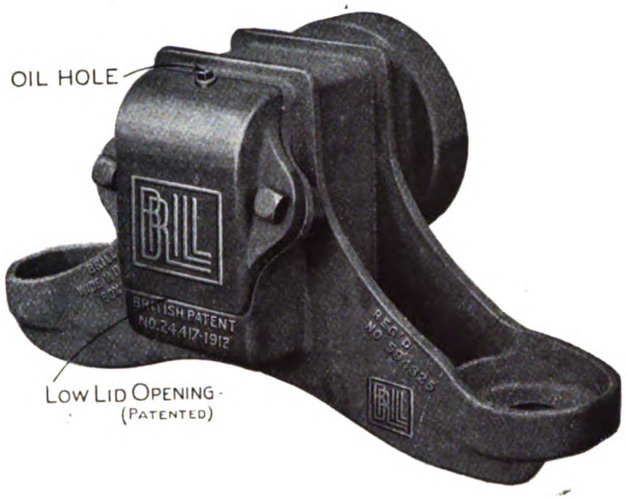

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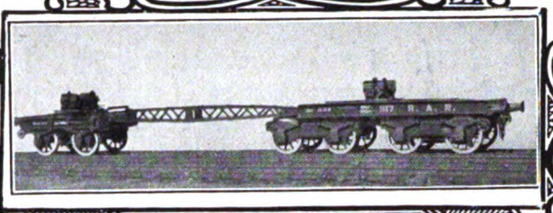

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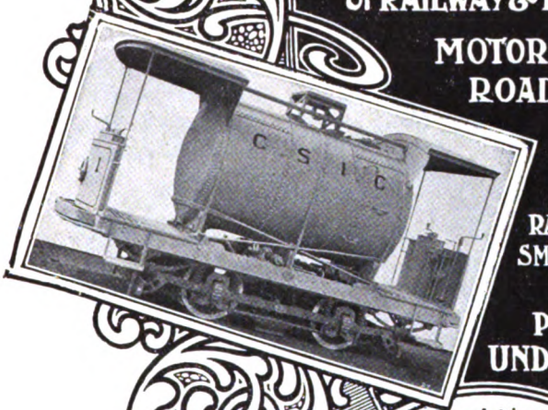

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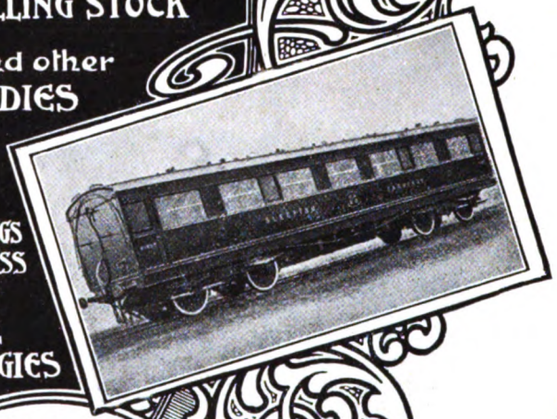

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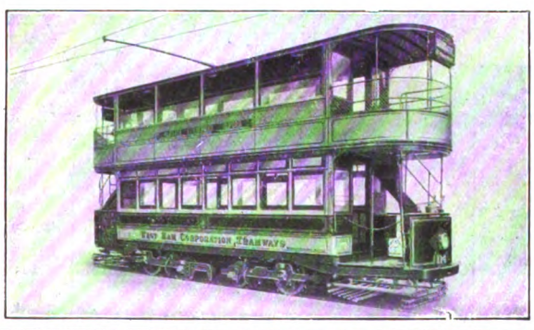

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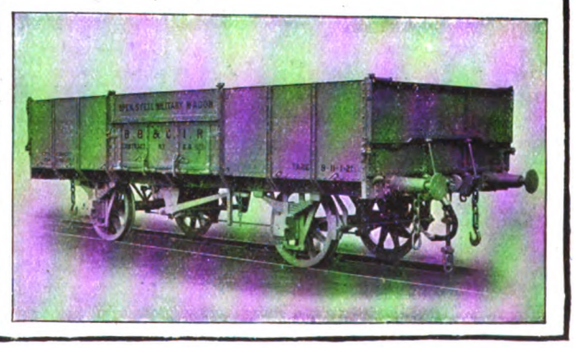

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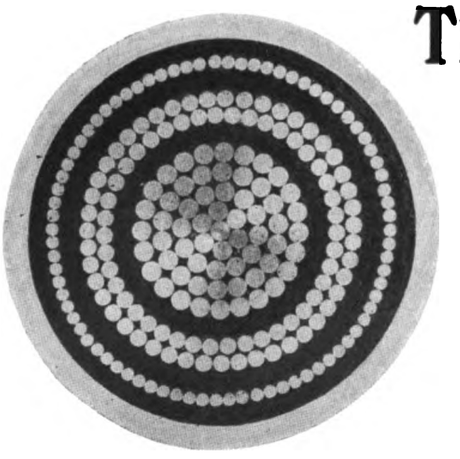

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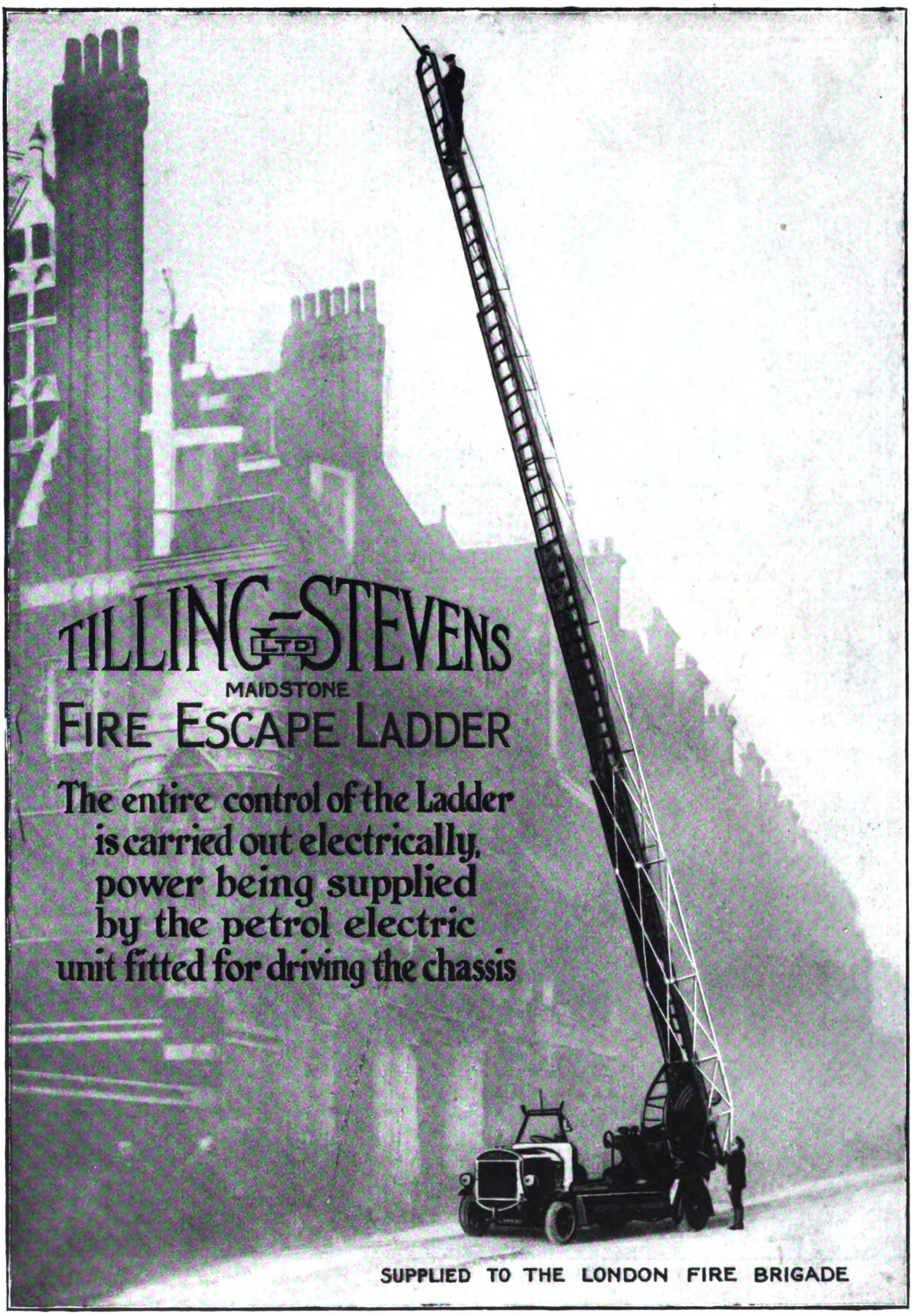
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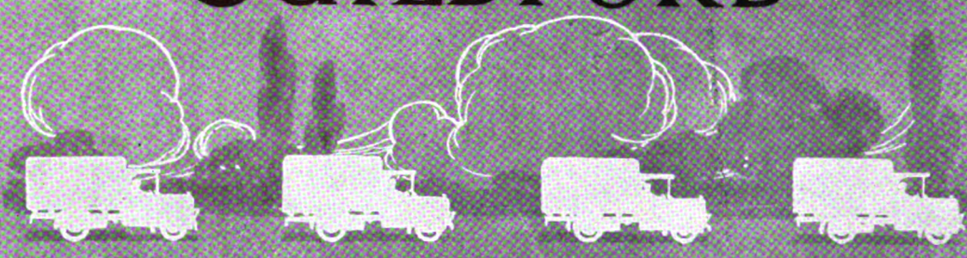

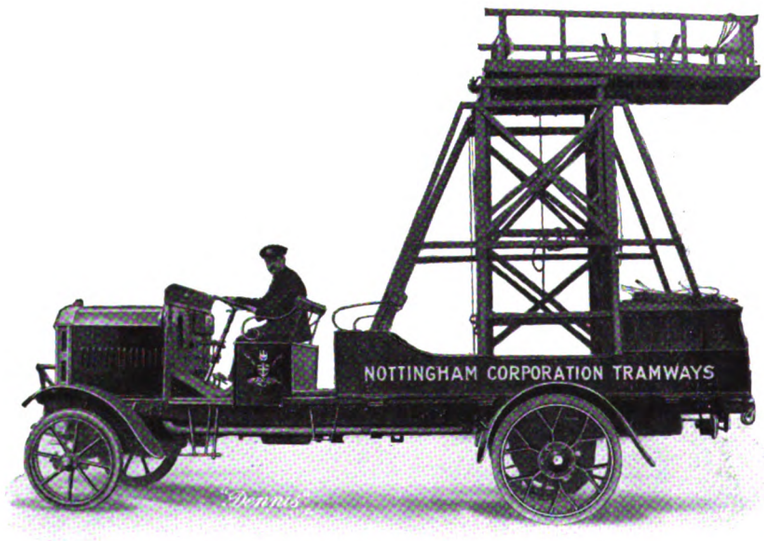

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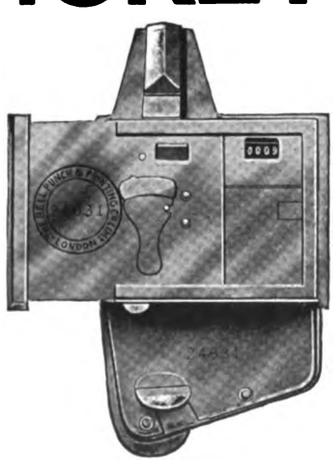

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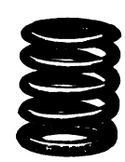

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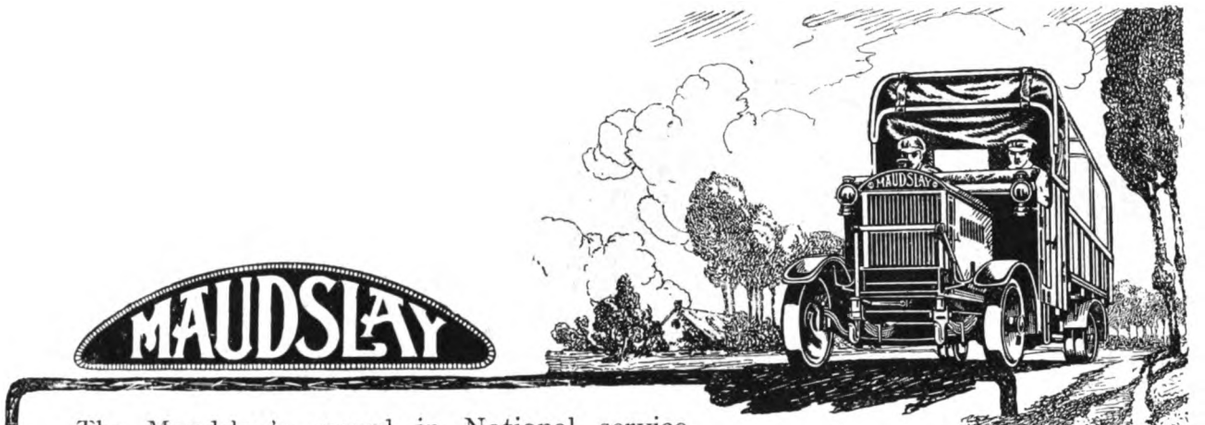

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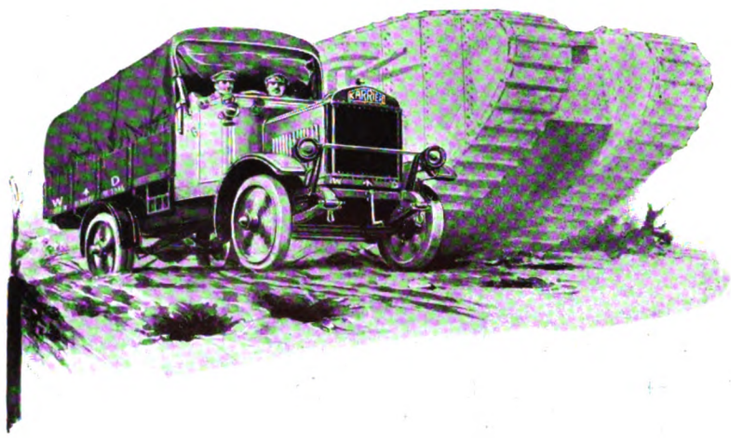

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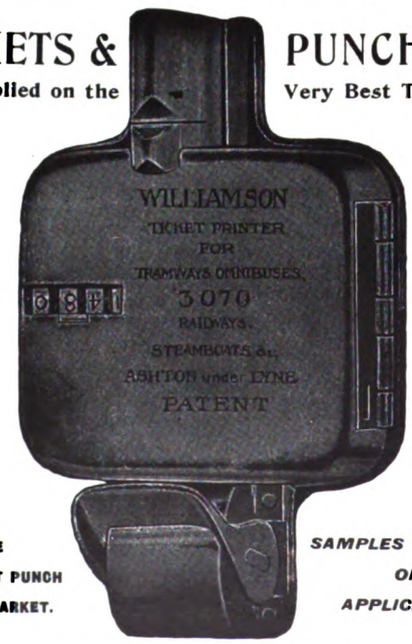

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MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles, including omnibuses, chars-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, and a variety of other types.

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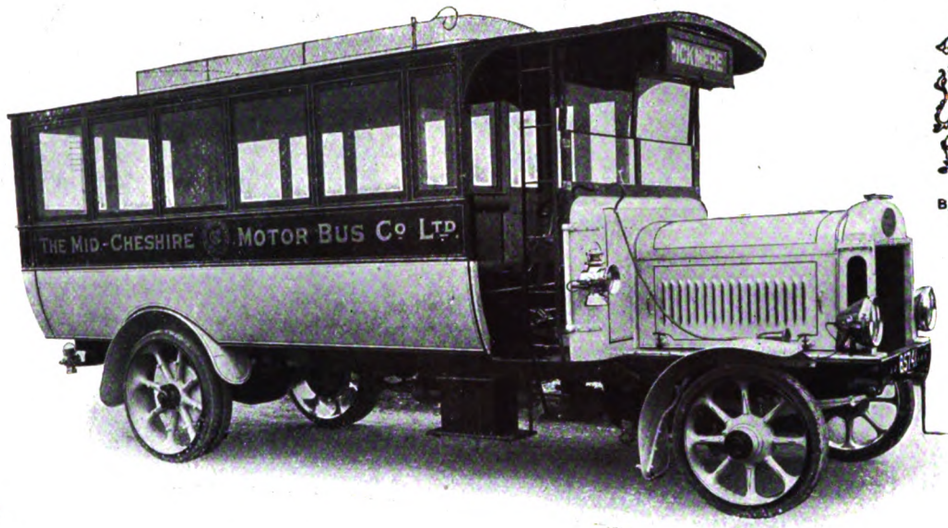

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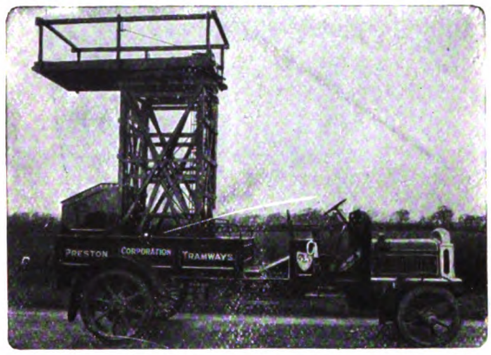

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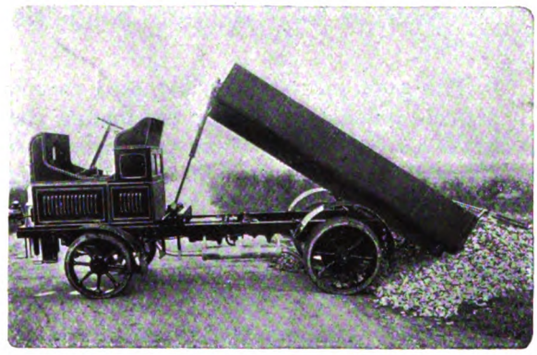

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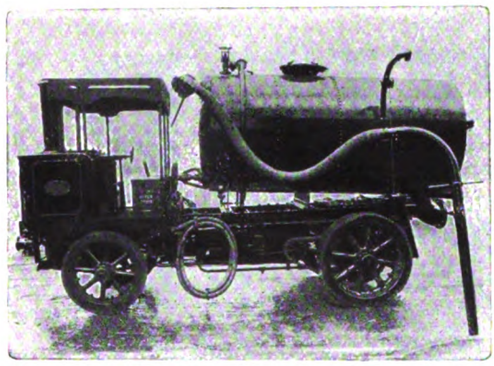

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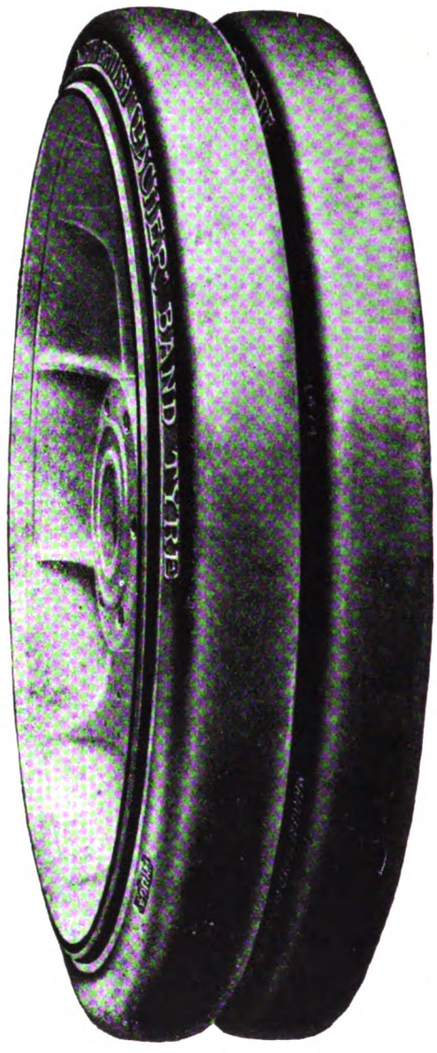

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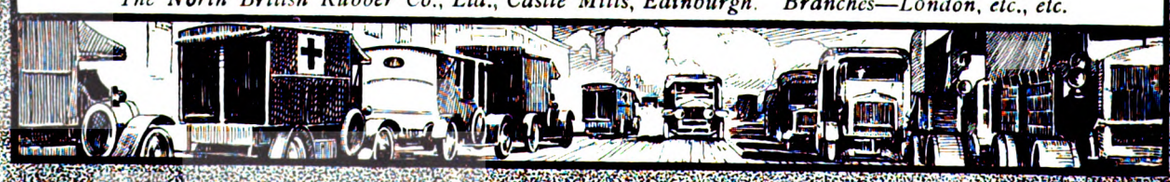

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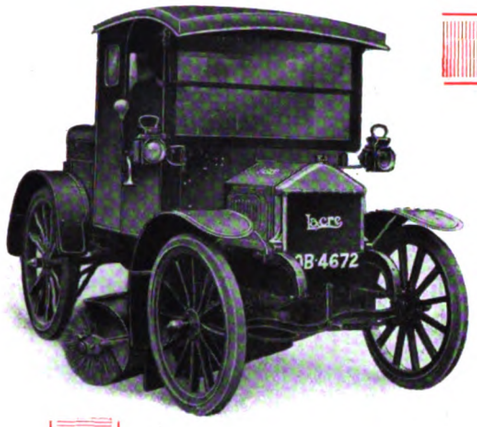

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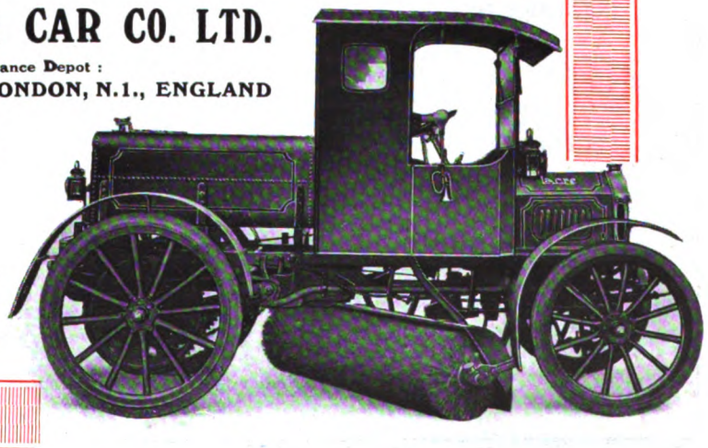

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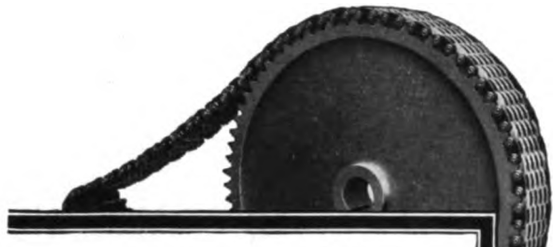

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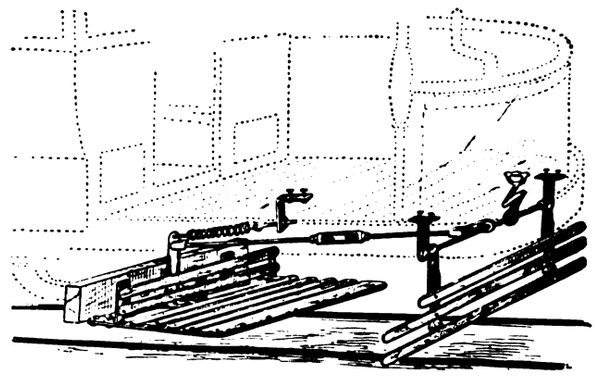

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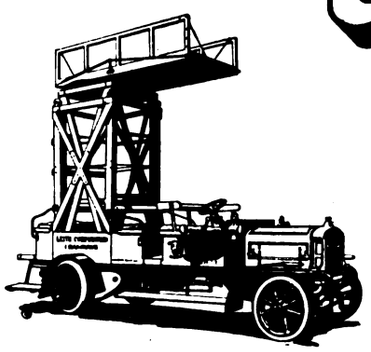

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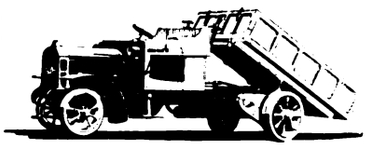

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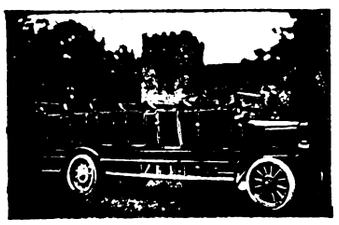

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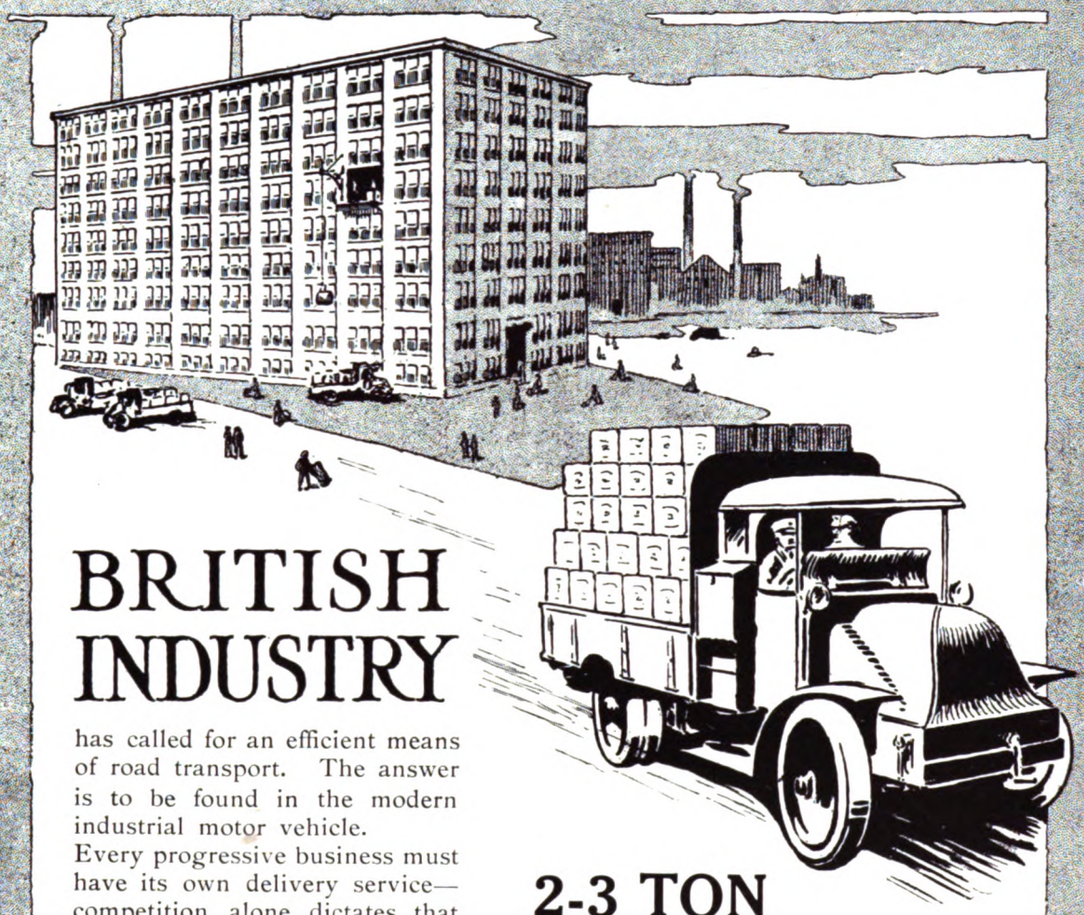

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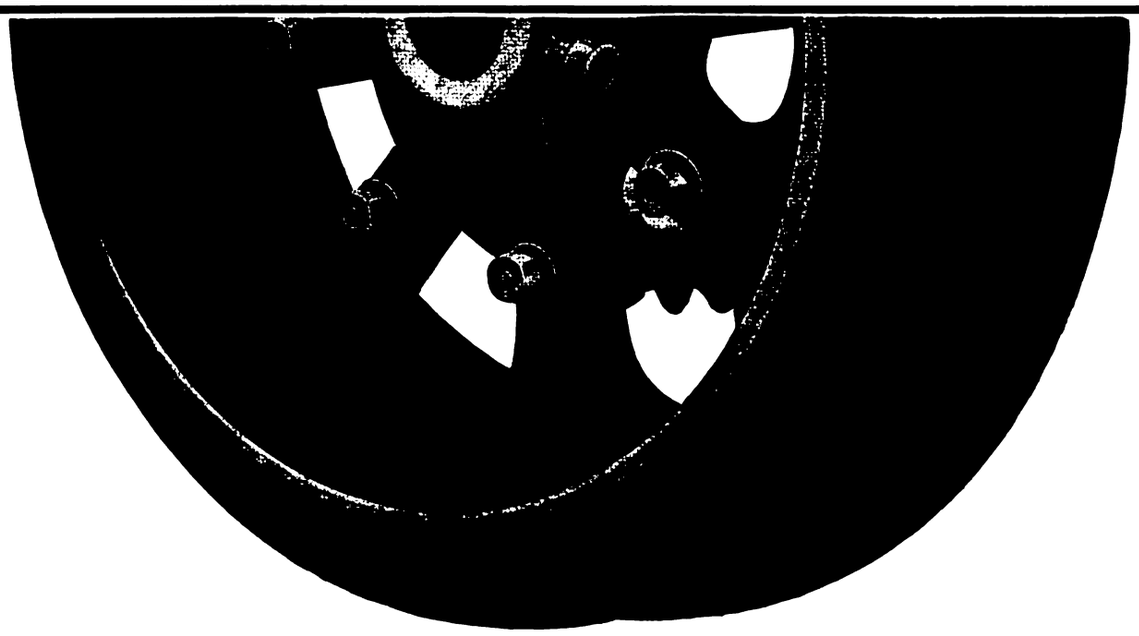

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S. 520

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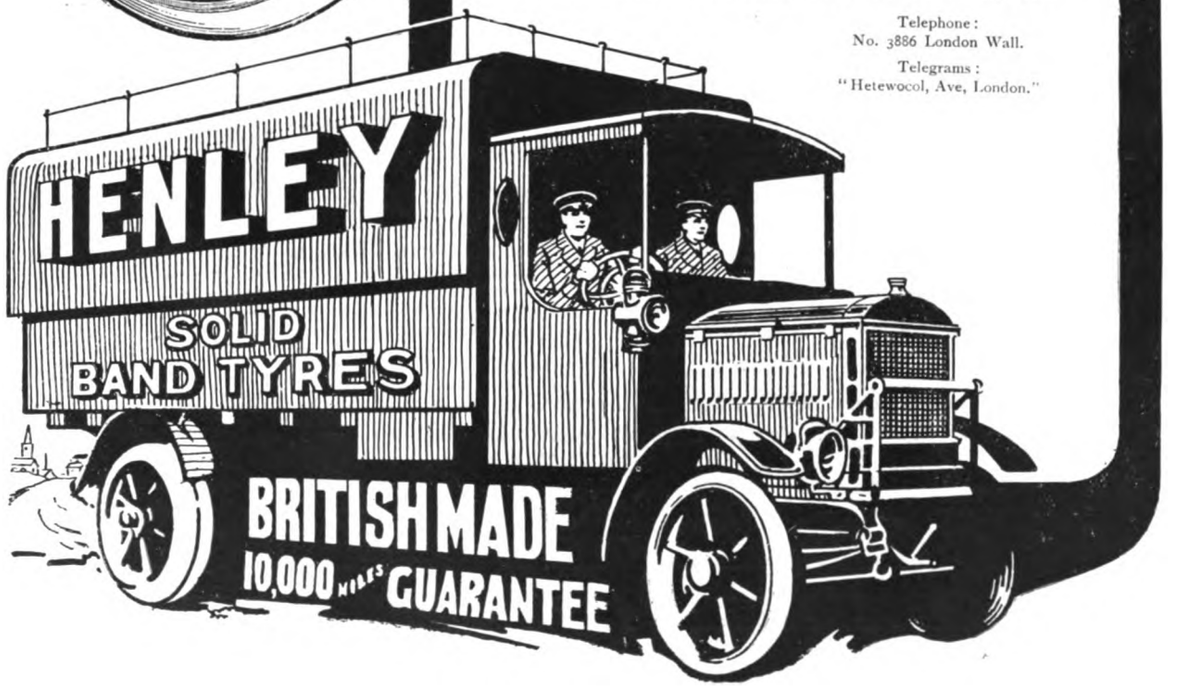

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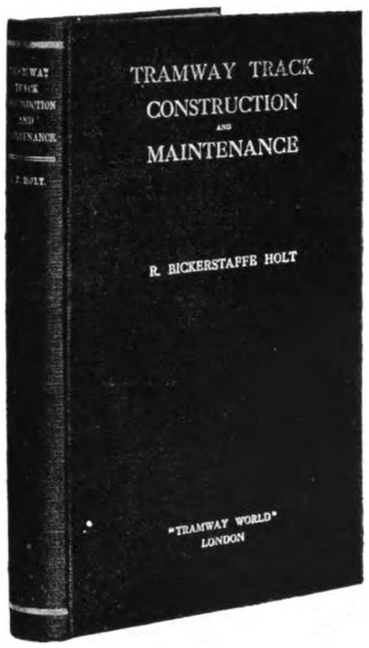

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Defects—Causes of fracture—Method of laying concrete.

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Road metal—Water gravel—Sand—Clinker sand—Trass.

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Patching—Partial repairs—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring new tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

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At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

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Effect of vehicular traffic—Cause of loose rails—Importance of quality in sets—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

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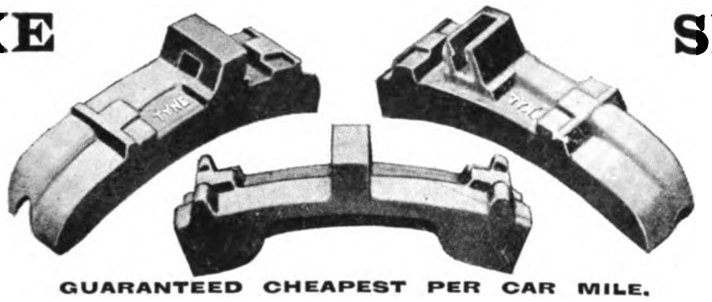

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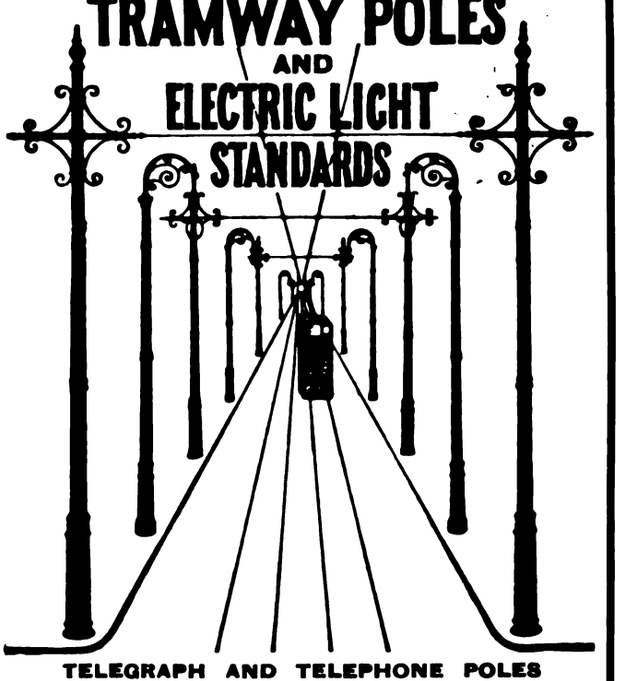

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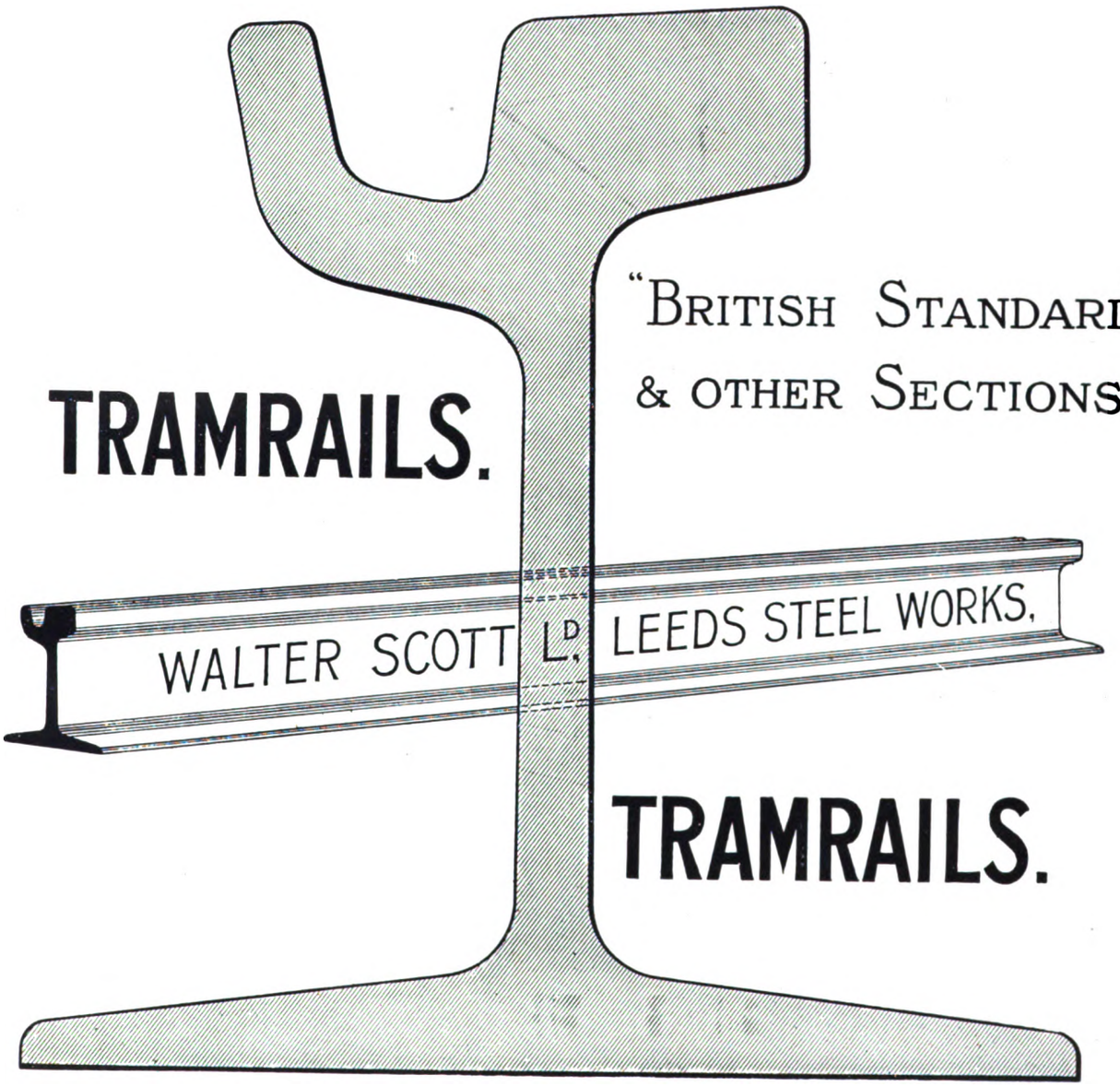

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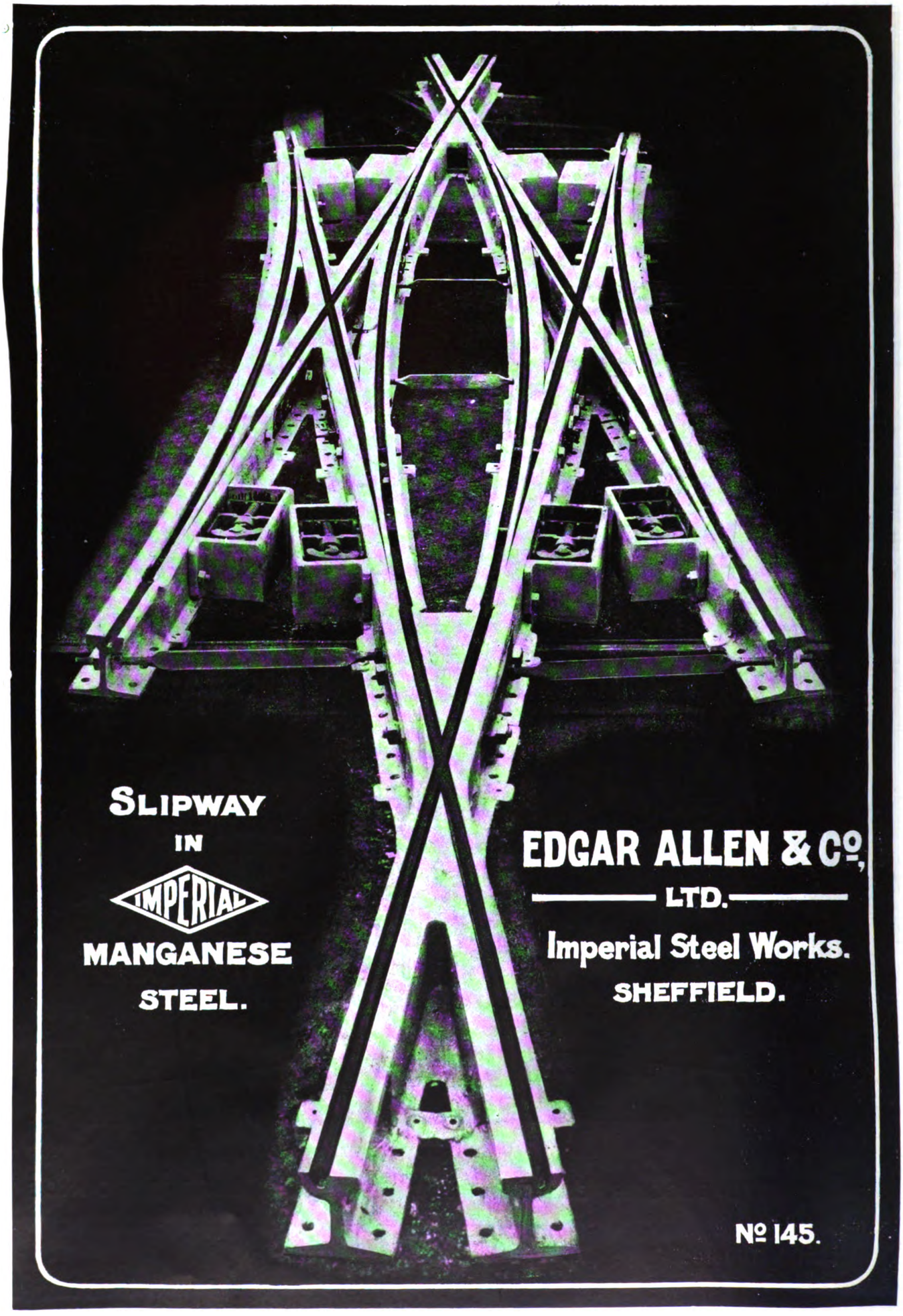

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Vol. XLII. No. 1.

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Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	Sheffield, 917, 265.
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield, (Tramway and Machinery)	Sheffield, 213.
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Attwater & Sons	Hopwood Street Mill, Preston	Attwaters, Preston	Preston, 1045 (2 lines).
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British Reinforced Concrete Engineering Co.	1, Dickinson Street, Manchester	Brenforce, Manchester	City, Manchester, 8430.
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Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	West Bromwich, 431.
Burford & Co., Ltd., H. G.	11, Waterloo Place, London, S.W.1	—	Regent, 5281.
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Coan, R. W.	219, Goswell Road, London, E.C.1	Krankases, Isling, London	Central, 4879 ; City, 3846
Commercial Cars, Ltd.	Biscot Road, Luton	Komerkars, Luton	Luton, 192 and 193.
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Dennis Bros. (1913), Ltd.	Onslow Works, Guildford	Dennis, Guildford	Guildford, 129, and 329.

(*Continued on page iv.*)

THE AUTOBUS
IN THE TRAMWAY WORLD.

Motor Traffic Section.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

"It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space had been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

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Docker Brothers, Ltd.	170, Bishopsgate, London, E.C.	Matured, London	London Wall, 775.
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Edison Swan Electric Co., Ltd.	Ponders End, Middlesex	Ediswan, Ponders End	Enfield, 520.
Electro-Mechanical Brake Co., Ltd.	Eagle Works, West Bromwich	Brakes, West Bromwich	West Bromwich, 291
Equipment & Engineering Co.	Westinghouse Building, Norfolk Street, London, W.C.	Kharparts, Estrand, London	City 1088 (2 lines).
Fodens, Ltd.	Sandbach, Cheshire	Foden, Sandbach	Sandbach, 7.
General Electric Co., Ltd.	67, Queen Victoria Street, London, E.C.	Polyphase, London	London Wall, 3600.
General Seating Co., Ltd.	13, City Road, London, E.C.	Cushioning, Finsquare, London	London Wall, 6187.
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow, 5350.
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Goodrich Co., Ltd., B. F.	117-123, Golden Lane, London, E.C.	Socketed-Barb, London	City, 5345.
Goodyear Tyre & Rubber Co., Ltd.	Central House, Kingsway, London, W.C.	Gotyruco, London	Regent, 3324.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester	Manchester, 1375.
Green & Co. (Feltham), Ltd., Geo. W.	Q-Fel Works, Feltham	Cufel, Feltham	Feltham, 14.
Grover & Co., Ltd.	Carpenters' Road, Stratford, E.	Adopted, Strat., London	Stratford, 984 and 985.
Hadfields, Ltd.	Hecla Works, Sheffield	Hadfield, Sheffield	Sheffield, 750, 2628, and 263
Hailey's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank, 196 and 197.
Hays, Hunter, & Slanden, Ltd.	110, Cannon Street, London, E.C.	Bimarginal, Cannon, London	City, 3456 & 3457.
Henley's Telegraph Works, Ltd.	13 and 14, Blomfield Street, London Wall, E.C.	Henletel, Ave., London	London Wall, 4560.
Henley's Telegraph Works, Ltd. (Tire Dept.)	18, Union Street, Moorfields, E.C.	Hetewocol, Ave., London	London Wall, 3886.
Herbert Frood Co., Ltd.	Sovereign Mills, Chapel-en-le-Frith	Friction, Chapel-en-le-Frith	Chapel-en-le-Frith, 19
Hoyt Metal Co., Ltd.	26, Billiter Street, London, E.C. 3.	Profanity, London	Central, 3020.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell, 44.
International Time Recording Co.	57, City Road, London, E.C.	Countable, Finsquare, London	London Wall, 6374.
Johnson & Phillips, Ltd.	Charlton, London, S.E.	Juno, Charlton, London, S.E.	Greenwich, 400.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks.	Kearsley, Ripon	Ripon, 5.
Lacre Motor Car Co., Ltd.	78, York Road, King's Cross, London, N.	Unbaffled, London	North, 2708
Leyland Motors, Ltd.	Leyland, Lancs.	Leymotors, Leyland	Leyland, 37.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.	Thoughtful, London	London Wall, 8186.
Macintosh & Co., Ltd., Chas.	Cambridge Street, Manchester	Macintosh, Manchester	Manchester, Central, 7147.
Magnolia Anti-Friction Metal Co., Ltd.	49, Queen Victoria Street, London, E.C.	Magnolier, Cannon, London	City 6596.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	Coventry, 110.
Millars' Timber and Trading Co., Ltd.	Pinners' Hall, London, E.C.	Jarrah, Stock, London	London Wall, 368.
Mirrlees, Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	South Side, 1781.
Motor Rail and Tram Car Co., Ltd.	79, Lombard Street, London, E.C.		Avenue, 1777.
Motor Traction	20, Tudor Street, London, E.C.	Autocars, Fleet, London	City, 2848.
Municipal Tramways Association	C. J. Spencer, 7, Hall Ings, Bradford	Tramways, Bradford	Bradford 2381 and 2382.
Napier & Son, Ltd., D.	14, New Burlington Street, London, W.	Nitrifier, Reg., London	Gerrard, 8926.
North British Rubber Co., Ltd.	Castle Mills, Edinburgh	Weba, Edinburgh	Edinburgh, Central, 3880
Oriental Tube Co., Ltd.	West Bromwich	Tubes, West Bromwich	West Bromwich, 45.
Patent File and Tool Co., Ltd.	8, White Street, Moorfields, E.C.	Ironheads, London	London Wall, 2683 and 296
Peacock Brake Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent London	Central 5735.
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	Middlesbrough, 917.
Peckham Truck and Engineering Co., Ltd.	26, Budge Row, Cannon Street, London, E.C.	Truxenpeck, London	City, 3294.
Pinchin, Johnson & Co., Ltd.	Minerva House, 26 and 27, Bevis Marks, London, E.C.	Pinchin, Ald., London	Avenue, 910.
Ruberoid Co., Ltd.	81-83, Knightrider Street, London, E.C.	Ruberoid, Cent., London	Central, 1480.
Russell & Sons, Ltd., James	Crown Tube Works, Wednesbury	Russell, Wednesbury	Wednesbury, 2.
Scholey & Co., Ltd.	56, Victoria Street, London, S.W.	Scolanco, Sowest, London	Victoria 6663 (2 lines).
Shepherds' Parging Block Co., Ltd.	Milkstone, Rochdale	Shepherd, Milkstone, Rochdale	Rochdale, 912.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	Manchester, Central, 962.
Siemens Brothers Dynamo Works, Ltd.	38 & 39, Upper Thames Street, London, E.C.	Siemotor, Cent, London	City 5350 (9 lines).
Simplex Conduits, Ltd.	Garrison Lane, Birmingham	Economy, Birmingham	Birmingham, Victoria, 535.
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, Kensal, London	Willesden, 550.
Skefko Ball Bearing Co., Ltd	Skefko Works, Luton	Skefko, Luton	Luton, 418.
Smethwick Stamping Co.	Bridge Street, Smethwick		
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	Manchester, 2334.
Spencer, Moulton & Co., Ltd., George	239, Deansgate, Manchester	Solspen, Manchester	Manchester City, 5180
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.		Avenue, 5463.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, City, 9880.
Straker-Squire, Ltd.	Nelson Square, Blackfriars, London, S.E.	Rhomboidal, London	Hop, 369 and 370.
Taylor, John	7, Strand Street, Liverpool	Velo, Liverpool	Liverpool (Bank), 4484.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Thermit, Ltd.	675, Commercial Road, London, E.	Fulmen, Step, London	East, 4157.
Thornycroft & Co., Ltd.	Caxton House, Westminster, London, S.W.	Thornycroft, London	Victoria, 8000
Tilling-Stevens, Ltd.	Victoria Works, Maidstone	Tilling-Stevens, Maidstone	Maidstone, 117.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central, 798.
Tramways and Light Railways Association	Caxton House, Westminster, London, S.W.	Tralitrayl, Vic., London	Victoria, 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.	Tramigro, London	Gerrard, 2948.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Controller, Leeds	Leeds, Central, 3488.
Tudor Accumulator Co., Ltd.	3, Central Buildings, London, S.W.	Subconical, London	Victoria, 2600.
Tyne Metal Co., Ltd.	Skinnerburn Road, Newcastle-on-Tyne	Floating, Newcastle-on-Tyne	Newcastle, 2943.
Underground Electric Railways Co.	Electric Railway House, London, S.W.	Underneath, Vic., London	Victoria, 6800.
United Electric Car Co., Ltd.	Preston, Lancs.	Prescar, Preston	Preston, 219 and 220.
Val de Travers Asphalte Paving Co., Ltd.	Hamilton House, Bishopsgate, London, E.C.	Traversable, Ave., London	London Wall, 7467.
Valor Co., Ltd.	Rocky Lane, Aston Cross, Birmingham	Valor, Birmingham	Birmingham, East, 252 and 259
Vandervell & Co., Ltd., C. A.	Warple Way, Acton Vale, London, W.	Vanteria, London	Chiswick, 2000 (8 lines).
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Bessemer, Leeds	Leeds, 510.
Waygood-Otis, Ltd.	Falmouth Road, London, S.E.	Waygood, Sedist, London	Hop, 4000.
Wells, A. C. & Co.	102-104, Midland Road, St. Pancras, London, N.W.	Unbreakable, Kincross, London	North, 341. [9886
White & Co. J. G.	9, Cloak Lane, Cannon Street, London, E.C.	Whitterick, Cannon, London	London Wall, 3306, and Central
White Motors & Accessories, Ltd.	Concanon Road, Brixton, London, S.W.	Genisean, London	Brixton, 565 and 566
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne.		Ashton-under Lyne, 320.
Wood-Milne, Ltd.	Ribble Bank Mills, Preston, Lancs.	Comfort, Preston	Preston, 413.
Yarwood & Co., Ltd., John	Bramber Rd., North End Rd., Fulham, London, S.W.	Bernotor, Weskkens, London	Kensington, 4211.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	Midland, 301
Zenith Carburetter Co., Ltd.	40-42; Newman Street, London; W.	Zenicarbur Ox, London	Regent 4812 and 4813.

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Continued from page iii.)

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE No.
Dick & Co., Ltd., W. B.	90, Fenchurch Street, London, E.C.3.	Dicotto, London	Avenue, 7854.
Dick, Kerr & Co., Ltd.	Abchurch Yard, Cannon Street, E.C.4	Dicker, Cannon, London	Bank 5866 (4 lines).
Docker Brothers, Ltd.	170, Bishopsgate. London, E.C.2	Matured, London	London Wall, 775.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	Birmingham, East, 123
Edison Swan Electric Co., Ltd.	Ponders End, Middlesex	Ediswan, Ponders End	Enfield, 520.
Electro-Mechanical Brake Co., Ltd.	Eagle Works, West Bromwich	Brakes, West Bromwich	West Bromwich, 291
Equipment & Engineering Co.	Westinghouse Bldg., Norfolk St., London, W.C.2	Kharparts, Estrand, London	City, 1088 (2 lines).
Fodens, Ltd.	Sandbach, Cheshire	Foden, Sandbach	Sandbach, 7.
Gabriel & Co.	4 and 5, A. B. Row, Birmingham	Gabriel, Birmingham	Birm'ham, Central, 1223
General Electric Co., Ltd.	67, Queen Victoria Street, London, E.C.4	Polyphase, London	London Wall, 3600.
General Seating Co., Ltd.	13, City Road, London, E.C.1	Cushioning, Finsquare, Lond.	London Wall, 6187.
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow, 5350.
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.2	Octet, Ave., London	London Wall, 262.
Goodrich Co., Ltd., B. F.	117-123, Golden Lane, London, E.C.1	Socketed, Barb, London	City, 5345.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester	Manchester, 1375.
Green & Co. (Feltham), Ltd., Geo. W.	Q-Fel Works, Feltham	Cufel, Feltham	Feltham, 14.
Grover & Co., Ltd.	Carpenters' Road, Stratford, London, E.15	Adopted, Strat., London	Stratford, 984 and 985
Hadfields, Ltd.	Hecla Works, Sheffield	Hadfield, Sheffield	Sheffield, 750, 2628, & 263
Halley's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank, 196 and 197
Hays, Hunter, & Standen, Ltd.	110, Cannon Street, London, E.C.4	Bimarginal, Cannon, London	City, 3456 and 3457.
Henley's Telegraph Works, Ltd.	13 and 14, Blomfield Street, London Wall, E.C.2	Henletel, Ave., London	London Wall, 4560.
Henley's Telegraph Works, Ltd. (Tire Dept.)	18, Union Street, Moorfields, E.C.2	Hetewocol, Ave., London	London Wall, 3886.
Herbert Frood Co., Ltd.	Sovereign Mills, Chapel-en-le-Frith	Friction, Chapel-en-le-Frith	Chapel-en-le-Frith, 19.
Hoyt Metal Co., Ltd.	189, Hammersmith Road, London, W.6.	Profanity, Phone London	Hammersmith 1702.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell, 44.
Imperial Motor Industries (1917), Ltd.	Denmark Street, Charing Cross Road, W.C.2	Giftedness, London	Gerrard, 3347 and 3348.
Johnson & Phillips, Ltd.	Charlton, London, S.E.7.	Juno, Charlton, London, S.E.	Greenwich, 400.
Kalker & Co., E.	23, Much Park Street, Coventry	Kalker, Coventry	Coventry, 24X.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	Ripon, 5.
Lacre Motor Car Co., Ltd.	78, York Road, King's Cross, London, N.1	Unbaffled, London	North, 2708.
Leyland Motors, Ltd.	Leyland, Lancs	Leymotors, Leyland	Leyland, 37.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.2	Thoughtful, London	London Wall, 8186.
Macintosh & Co., Ltd., Chas.	Cambridge Street, Manchester	Macintosh, Manchester	Manchester, Central, 7147.
Magnolia Anti-Friction Metal Co., Ltd.	49, Queen Victoria Street, London, E.C.4	Magnolier, Cannon, London	City, 6596.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	Coventry, 110.
Mirrlees Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	South Side, 1781.
Motor Rail and Tram Car Co., Ltd.	79, Lombard Street, London, E.C.3	—	Avenue, 1777.
Motor Traction	20, Tudor Street, London, E.C.4	Autocars, Fleet, London	City, 2848
Municipal Tramways Association	Division Street, Sheffield	Tramways, Sheffield	Sheffield 4600
Napier & Son, Ltd., D.	14, New Burlington Street, London, W.1	Nitrifier, Reg., London	Gerrard, 8926.
North British Rubber Co., Ltd.	Castle Mills, Edinburgh	Weba, Edinburgh	Edinburgh, Central, 3880
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	Middlesbrough, 917.
Peckham Truck and Engineering Co., Ltd.	26, Budge Row, Cannon Street, London, E.C.4	Truxenpeck, London	City, 3294.
Pinchin, Johnson & Co., Ltd.	Minerva House, 26-27, Bevis Marks, London, E.C.3	Pinchin, Ald., London	Avenue, 910.
Ruberoid Co., Ltd.	81-83, Knightrider Street, London, E.C.4	Ruberoid, Cent., London	Central, 1480
Scholey & Co., Ltd.	56, Victoria Street, London, S.W.1	Scolanco, Sowest, London	Victoria, 6663 (2 lines).
Shepherds' Parging Block Co., Ltd.	Milkstone, Rochdale	Shepherd, Milkstone, Roch-	Rochdale, 912.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester [dale	Manchester, Central, 962.
Siemens Brothers Dynamo Works, Ltd.	38 & 39, Upper Thames Street, London, E.C.4	Siemotor, Cent., London	City 5350 (9 lines).
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, Kensal, London	Willesden, 550.
Skefko Ball Bearing Co., Ltd.	Shefko Works, Luton	Skefko, Luton	Luton, 418.
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	Manchester, 2334.
Spencer, Moulton & Co., Ltd., George	239, Deansgate, Manchester	Solspen, Manchester	Manchester City, 5180
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.3	Gramercy, London	Avenue, 5463.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, City, 9880.
Straker-Squire, Ltd.	Nelson Square, Blackfriars, London, S.E.1	Rhomboidal, London	Hop, 369 and 370.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Thermit, Ltd.	675, Commercial Road, London, E.14.	Fulmen, Step, London	East, 4157.
Thornycroft & Co., Ltd.	Caxton House, Westminster, London, S.W.1	Thornycroft, London	Victoria, 8000.
Tilling-Stevens, Ltd.	Victoria Works, Maidstone	Tilling-Stevens, Maidstone	Maidstone, 117.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central, 708.
Tramways and Light Railways Association	Sanctuary Chambers, Tothill St., London, S.W.1	Tralitrayl, Vic., London	Victoria, 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.2	Tramigro, London	Gerrard, 2948.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Controller, Leeds	Leeds, Central, 3488.
Tudor Accumulator Co., Ltd.	3, Central Buildings, London, S.W.1	Subconical, London	Victoria, 2600.
Tyne Metal Co., Ltd.	Hexham-on-Tyne	Floating, Hexham	Hexham, 189.
Underground Electric Railways Co.	Electric Railway House, London, S.W.1	Underneath, Vic., London	Victoria, 6800.
United Electric Car Co., Ltd.	Preston, Lancs	Prescar, Preston	Preston, 210 and 220
Val de Travers Asphalte Paving Co., Ltd.	Hamilton House, Bishopsgate, London, E.C.2	Traversable, Ave., London	London Wall, 7467.
Vandervell & Co., Ltd., C. A.	Warple Way, Acton, London, W 3.	Vanteria, London	Chiswick, 2000 (8 lines.
Vislok, Ltd.	3, St. Bride's House, London, E.C.4	—	Central, 8157.
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Bessemer, Leeds	Leeds, 510.
Waygood-Otis, Ltd.	Falmouth Road, London, S.E.1	Waygood, Sedist, London	Hop, 4000.
Wells, A. C., & Co.	102-104, Midland Road, St. Pancras, N.W.1	Unbreakable, Kincross, Lond.	North, 341.
White Motors & Accessories, Ltd.	Concanon Road, Brixton, London, S.W.2	Genisean, London	Brixton, 565 and 566.
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne	—	Ashton-under-Lyne, 320.
Wood-Milne, Ltd.	21, Albion Street, Gaythorn, Manchester,	Wudmiln, Manchester	Manchester City, 8774.
Yarwood & Co., Ltd., John	Bramber Rd., North End Rd., Fulham, S.W.14	Bernotor, Weskkens, London	Kensington, 4211.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	Midland, 301.
Zenith Carburetter Co., Ltd.	40-42, Newman Street, London, W.1	Zenicarbur, Ox, London,	Regent, 4812 and 4813.

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